



## User Manual

### **funkwerk S1224p FastEthernet PoE Switch**

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Version 1.1



<b>Purpose</b>	This document describes how to install and use the <b>funkwerk S1224p FastEthernet PoE Switch</b> .
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<b>CE Mark Warning</b>	This is a class A product. If operated in a domestic environment, the device may cause interferences. As a result, the user may have to take appropriate countermeasures.



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# 1 Introduction

When using Power-over-Ethernet (PoE), the devices are powered via network cabling with a voltage of 110/220 V AC. If Power-over-Ethernet is applied, only one Cat. 5 Ethernet cable is required, which transports both the power and data to each device. This offers more flexibility in the placement of the network devices and leads to considerable cost reduction in many cases.

In the case of PoE, two system components are used: the Power Sourcing Equipment (PSE), which provides the power and sets up the connection to the second component, the Powered Device (PD). The electric current flows over 2 of the 4 twisted pair wires of the Cat. 5 cable.

Power-over-Ethernet complies to the IEEE 802.3af Standard and is absolutely compatible with state-of-the-art Ethernet switches and network devices. The Power Sourcing Equipment (PSE) checks whether the network device is PoE-capable. This means that a current will only flow if it has been ensured that a powered device has been connected at the other end of the cable. Moreover, the PSE monitors the transmission channel. If the powered device does not use up a minimum power, because it has been disconnected or switched off, the PSE will switch off the power supply to this port. As an option, the standard permits the powered devices to signal the PSEs how much power they precisely require.

The **funkwerk S1224p FastEthernet PoE Switch** is a multi-port switch which can be used to set up high-performance, switched workgroup networks.

The switch is a device which permits store-and-forward switching and offers low latencies for high-speed networks. This enables the switch to perform auto-learning and to store source addresses in a MAC address table by means of 8 K entries. The switch has been designed for the operation in networks for work-groups, departments, or backbones.

The **funkwerk S1224p FastEthernet PoE Switch** provides 24 10/100Base-TX RJ-45 ports with auto-sensing, and all ports support the POE inject functionality. The switch offers 2 auto-detect Giga ports for higher data rates. In addition, the switch is equipped with an additional jack for 48 V DC.

## 1.1 Features

- 24 10/100 plus 2 MINI GBIC /RJ-45 combo-switch with 24 POE injector and integrated 200 W AC.
- Complies with IEEE802.3 10BASE-T, 802.3u 100BASE-TX/FX, 802.3ab 1000BASE-T, 802.3z Gigabit Optical Fiber, 802.3af Power-over-Ethernet.
- Offers an additional redundant 48 V DC connection and a power status query option over the RS-232 port.
- High backplane bandwidth of 8.8 Gbps
- Rapid Spanning Tree IEEE802.1w
- IGMP snooping and support of the IGMP query mode for multimedia applications
- Port mirror and bandwidth control
- GVRP function
- Remote power supply over UTP cable connection to the end point
- IEEE802.3x flow control
  - Full-duplex flow control
  - Half-duplex back pressure
- Port-based VLAN /802 .1Q Tag VLAN
- IEEE802.3ad port trunk with LACP
- Supports Spanning Tree protocol IEEE 802.1d
- IEEE 802.1p Class of Service
- IEEE 802.1x User Authentication
- TACACS+ (optional)
- Broadcast storm filter
- DHCP client
- SNTP

- System event log
- Command line interface management
- Management over Web/SNMP/Telnet/console
- Online power supply test over the RS-232 port

## 1.2 Software Features

<b>MANAGEMENT</b>	SNMP management Telnet management Web management RS-232 terminal console for command line interface management
<b>SNMP MIB</b>	RFC 1157 SNMP RFC 1213 MIB II RFC 1643 Ethernet-like interfaces RFC 1493 bridge MIB RFC 2674 VLAN MIB Private MIBRFC 1628 UPS MIB RFC3621 Power Ethernet MIB
<b>TRAP TYPE</b>	Cold start Warm start Link down Link up Authentication failed Up to 3 trap stations

<b>RFC STANDARD</b>	RFC 2030 SNTP RFC 2821 SMTP (optional) RFC 1492 TACACS+ (optional) RFC 1215 Trap RFC 1757 RMON 1
<b>SOFTWARE UPGRADE</b>	TFTP Console
<b>PORT TRUNK</b>	Supports IEEE802.3ad with LACP function Up to 7 trunk groups with up to 4 connections each Trunk port integrated in 24-port 10/100TX and 2 auto mini GBIC / copper ports
<b>SPANNING TREE</b>	IEEE802.1d Spanning Tree IEEE802.1w Rapid Spanning Tree
<b>VLAN</b>	Port-based VLAN IEEE802.1Q Tag VLAN IEEE802.1v protocol VLAN (IP, IPX,..) Up to 256 static and up to 2048 dynamic VLAN groups VLAN IDs from 1 to 4094 can be assigned
<b>CLASS OF SERVICE</b>	For each system, high- and low-priority queues are supported Priority rules: First come first service, All high before low, WRR for high or low weight
<b>PORT-BASED PRIORITY</b>	3 settings are supported: disabled, low or high priority If "Disabled" is selected, the packet will be treated according to the QoS rules; otherwise the port priority setting for high- or low-priority queues will be applied to the packet
<b>IGMP</b>	IGMP snooping for multimedia applications and support of up to 256 groups

<b>PORT SECURITY</b>	Filters for ingress and egress MAC addresses, as well as static MAC source address blocking
<b>PORT MIRROR</b>	The switch supports 3 mirroring types: RX, TX, and both packet types Up to 25 port mirror entries supported
<b>BANDWIDTH CONTROL</b>	Every port supports bandwidth control. Can be set in increments of 100 kbps.
<b>802.1X AUTHENTICATION</b>	IEEE802.1x user authentication and report to RADIUS server <ul style="list-style-type: none"><li>■ Reject</li><li>■ Accept</li><li>■ Authorize</li><li>■ Disable</li></ul>
<b>DHCP</b>	DHCP client
<b>PACKET FILTER</b>	Broadcast storm filter
<b>SYSTEM SETUP AND CONTROL</b>	System calibration IEEE 802.3af resistance adaptation
<b>ERROR STATUS DETECTION</b>	Null: No device connected Overload if current above 475 mA at 48 V DC for over 50 milliseconds DR error: PD resistance test result outside the allowed range
<b>PARAMETER INFORMATION</b>	Display of current device parameters: <ul style="list-style-type: none"><li>■ Resistance test result</li><li>■ Current voltage</li><li>■ Power consumption</li><li>■ Classification current</li><li>■ Determined class</li></ul>

<b>PORT CONTROL CONFIGURATION</b>	Port enable / disable PD device detection control (enable / disable) Classification detection control (enable / disable) Detection of interrupted power supply control
<b>MODE</b>	System detects status: ■ I-Sample ■ V-Sample ■ R-Detect
<b>NTP</b>	RFC 2030 Simple Network Time Protocol (optional)
<b>SMTP</b>	RFC2821 Simple Mail Transfer Protocol (optional)
<b>SYSTEM PROTOCOL</b>	System protocol records up to 1000 entries
<b>POWER MONITOR</b>	Power supply monitoring for AC, DC, fan status The POE switch supports 3 types of power supply: POW-DPW, POE-SPW, and POE-UPW
<b>POWER SUPPLY TEST</b>	Power supply monitoring function

### 1.3 Scope of Delivery

Unpack the package contents of the **funkwerk S1224p FastEthernet PoE Switch** and compare them with the components of the check list below.

- **funkwerk S1224p FastEthernet PoE Switch**
- Power cord
- 4 rubber feet

- Rack mounting kit
- RS 232 cable
- User manual on CD-ROM

Please compare the package contents of your **funkwerk S1224p FastEthernet PoE Switch** with the scope of delivery specified above. If a component is damaged or missing, please consult your local dealer.



## 2 Hardware Description

This chapter describes the hardware of the **funkwerk S1224p FastEthernet PoE Switch** and gives an overview of the setup and functions of the switch.

### 2.1 Physical Dimensions

The physical dimensions of the **funkwerk S1224p FastEthernet PoE Switch** are *440 mm (width) x 280 mm (depth) x 44 mm (height)*.

### 2.2 Front Panel

The front panel of the **funkwerk S1224p FastEthernet PoE Switch** accommodates 24 10/100Base-TX RJ-45 ports (Auto MDI/MDIX), 2 Auto-Detect Giga ports, and 1 console port. The LEDs are also integrated in the front panel of the switch.

- **RJ-45 PORTS (Auto MDI/MDIX):** 24 10/100 N-way auto-sensing for 10Base-T or 100Base-TX connections.  
**MDI** generally means the setup of a connection to another hub or switch, while **MDIX** stands for the setup of a connection to another end device or PC. The **Auto-MDI/MDIX** feature allows you to set up a connection to another switch or end device without having to use a cross-over cable.
- 2 Giga ports: 2 auto-detect Giga ports: UTP or optical fiber. Giga optical fiber is the optional mini-GBIC module.

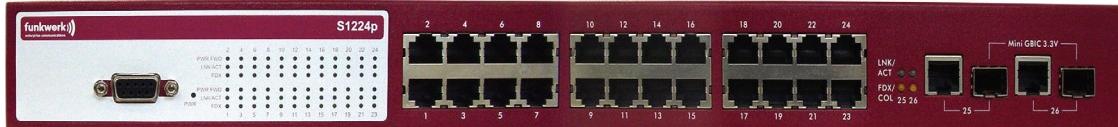


Figure 2-1: Front panel of the **funkwerk S1224p FastEthernet PoE Switch**

## 2.3 LEDs

The LEDs show the current operating state of the device. There are three LEDs (link / activity, full-duplex, power forwarding) for each UTP port, and one power LED for the device. The table below describes the various states of the LEDs and explains what they mean.

LED	Status	Description
<b>POWER</b>	<i>Green</i>	Power on.
	<i>Off</i>	Power off.
<b>LNK/ACT</b>	<i>Green</i>	A device is connected at the port.
	<i>Blinking</i>	Data is being transmitted over this port.
	<i>Off</i>	No device connected.
<b>FDX</b>	<i>Orange</i>	The port works in full-duplex mode.
	<i>Off</i>	The port works in half-duplex mode.
<b>POWER FORWARDING</b>	<i>Green</i>	The POE injector functionality is enabled, and the connected PD receives power.
	<i>Off</i>	POE injector functionality off.
<b>1000 (25 &amp; 26 PORTS / GIGA PORTS)</b>	<i>Green</i>	Data rate: 1,000 Mbps

LED	Status	Description
<b>100 (25 &amp; 26 PORTS / GIGA PORTS)</b>	Orange	Data rate: 100 Mbps
<b>LNK / ACT (25 &amp; 26 PORTS / GIGA PORTS)</b>	Green	A device is connected at the port.
	Blinking	Data is being transmitted over this port.
	Off	No device connected.
<b>FDX / COL (25 &amp; 26 PORTS / GIGA PORTS)</b>	Orange	The port works in full-duplex mode.
	Blinking	Collision of packets on the port.
	Off	The port works in half-duplex mode.

## 2.4 Rear Panel

The two fans, two console ports, and the network jack are located at the rear panel of the **funkwerk S1224p FastEthernet PoE Switch**, as shown in the figure. In addition, the switch provides a 48-V DC connection for the additional power supply as well as an internal 48-V DC connection for the redundant power supply. The two console ports can be used to connect and manage the UPS or power supply device.



Figure 2-2: Rear panel of the **funkwerk S1224p FastEthernet PoE Switch**

## 2.5 Desktop Installation

Place the switch on a sufficiently large and level area in the near of a mains socket. The surface on which you place the switch must be clean, smooth, level, and solid. Make sure that there is enough space around the switch to connect cables and permit sufficient air circulation around the device.

### 2.5.1 Attaching the Rubber Feet

1. Make sure that the lower side of the switch is grease- and dust-free.
2. Remove the protective sheet from the rubber feet.
3. Attach the rubber feet at the marked positions at the lower side of the switch. The rubber feet prevent the switch from being toppled in the case of vibrations.

## 2.6 Rack Mounting

The switch comes with a rack mounting kit and can be installed in a 19" EIA standard rack. The switch can be inserted in a floor distributor along with other devices.

To mount the switch in a rack, proceed as follows:

1. Position a corner above the cut-outs on one side of the switch, and secure it with the smaller screws. Then install the remaining corner on the other side of the switch.
2. After installing both mounting corners, position the **funkwerk S1224p FastEthernet PoE Switch** in the rack by placing the cut-outs in the mounting corners above the cut-outs of the rack. Secure the switch in the rack by fastening the rack mounting screws with a screwdriver.

**Note**

When mounting the switch in a rack, always use the mounting corners provided.

## 2.6.1 Connection to the Power Supply

Plug in the power cord at the corresponding jack at the rear side of the switch. Plug in the other end of the power cord into a mains socket. The integrated power supply is operated in a voltage range of 100 - 240 V AC and in a frequency range of 50 - 60 Hz. Check the LED for the power supply (Power) at the front panel of the device. It shows you whether you have connected the device correctly to the power supply.



## 3 Network Application

Its large address table (8 K MAC addresses) and its high performance make the **funkwerk S1224p FastEthernet PoE Switch** ideally suited for the connection of network segments.

PCs, workstations, and servers can communicate through a direct connection with the **funkwerk S1224p FastEthernet PoE Switch**. The switch automatically learns the addresses of the nodes and uses them subsequently to filter and forward the complete data traffic directed to the destination addresses.

Through the uplink port of the switch, a connection to another switch or hub can be set up, and other, smaller switched workgroup networks can be connected. In this way, larger switched networks can be set up. Based on state-of-the-art technology, optical fiber ports can be used to connect switches. The distance between two switches connected over optical fiber can be up to 550 meters (multimode fiber) or 10 kilometers (single-mode fiber).

### 3.1 Power over Ethernet Application

The **funkwerk S1224p FastEthernet PoE Switch** offers a POE injector functionality on every Ethernet port which can provide power to the PD, such as a WLAN access point or a PoE-capable telephone. This functionality is helpful if there are not enough power outlets available at the site the PD is located.

### 3.2 DC Power Supply

The **funkwerk S1224p FastEthernet PoE Switch** provides an additional network connector for a 48 V DC power supply. The 48 V DC power supply can be used as a spare power supply if the AC power supply fails or is not available at the installation site. The DC and 48 V AC power supply can both be connected at the same time. In that case, the switch will use the 48 V DC supply as its main power supply, and the DC supply as secondary or spare power supply.

### 3.3 Redundant Power Supply

To protect the **funkwerk S1224p FastEthernet PoE Switch** from power outages, it can be connected to a UPS (Uninterruptible Power Supply).

## 4 Console Management

### 4.1 Connection to the Switch

The console port is a DB-9 jack, which allows the connection to a PC or a terminal to monitor and configure the switch. Please use the RS-232 cable included in the delivery with a DB-9 plug to connect a terminal or a PC to the console port. The console configuration (out-of-band) allows the user to configure the switch through a direct connection over the RS-232 cable.

### 4.2 Log-on to the Console Interface

After setting up the connection between the PC and the switch, turn on the PC and start a terminal emulation program, e. g. **Hyper Terminal**. Configure the *communication parameters*. They have to match the following default settings for the console port:

- **BITS PER SECOND:** 9600 bps
- **DATA BITS:** 8
- **PARITY:** None
- **STOP BITS:** 1

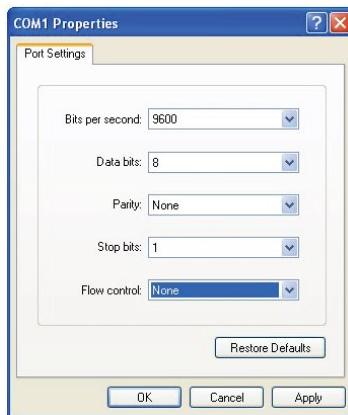
**■ FLOW CONTROL: None**

Figure 4-1: Settings of the communication parameters

After entering the settings for the parameters, click "OK". If an empty screen is displayed, press the Enter key to call the log-on dialog box. Enter the default parameters "admin" as the user name and "funkwerk" as the password (use the Enter key to go from one input field to the next). Press the Enter key. Subsequently, the console management menu will be displayed. The figure below shows the log-on screen:

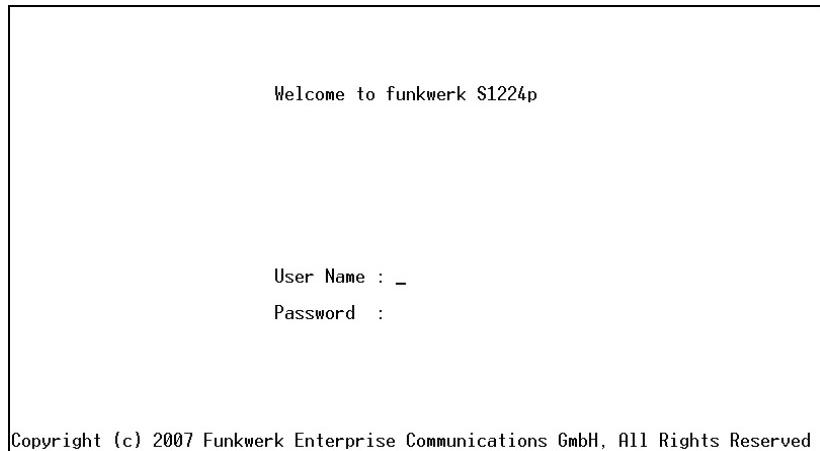


Figure 4-2: Console log-on screen

## 4.3 CLI Management

The system supports two types of console management—CLI commands and the selection via the menu. After logging on to the system, you will be prompted to enter a command. To go to the CLI management interface, enter the `enable` command. The following table lists the CLI commands and describes them.

### 4.3.1 Command Level

Mode	Access Method	Prompt	Exit Method	About This Mode
<b>USER EXEC</b>	Start a session with your switch.	switch>	Enter "logout" or "quit".	<p>The user commands, which are available on the user level, are a subgroup of the commands offered on the privileged level.</p> <p>You can use this mode to</p> <ul style="list-style-type: none"><li>■ carry out basic tests</li><li>■ display system information</li></ul>

Mode	Access Method	Prompt	Exit Method	About This Mode
<b>PRIVILEGED EXEC</b>	If you are working in the User EXEC mode, enter the "enable" command.	switch#	Enter "disable" to exit this mode.	The Privileged Mode is an extended mode. You can use this mode to <ul style="list-style-type: none"> <li>■ display the status of extended functions</li> <li>■ store configurations</li> </ul>
<b>GLOBAL CONFIGURATION</b>	Enter this command if you are working in the Privileged EXEC mode.	switch (config)#	To exit this mode and return to the Privileged EXEC mode, enter "exit" or "end".	Use this mode to configure parameters which are valid for your switch as a total.
<b>VLAN DATABASE</b>	If you are working in the Privileged EXEC mode, enter the "vlan database" command.	switch (vlan)#	To exit this mode and return to the User EXEC mode, enter "exit".	Use this mode to configure VLAN-specific parameters.
<b>INTERFACE CONFIGURATION</b>	If you are working in the Global Configuration mode, enter the "interface" command (with a specific interface).	switch (config-if)#	To exit this mode and return to the Global Configuration mode, enter "exit". To return to the Privileged EXEC mode, enter "end".	Use this mode to configure parameters for the switch port and to configure the Ethernet port.

Mode	Access Method	Prompt	Exit Method	About This Mode
<b>UPS</b>	Enter the "ups" command if you are working in the Privileged EXEC mode.	switch(ups)#	To exit this mode and return to the Privileged EXEC mode, enter "exit".	Use this mode to configure the parameters for the uninterruptible power supply.
<b>POE</b>	Enter the "poe" command if you are working in the Privileged EXEC mode.	switch(poe)#	To exit this mode and return to the Privileged EXEC mode, enter "exit".	Use this mode to configure the POE parameters for the switch.

## 4.4 List of Commands

### System Commands

Commands	Command Level	Description	Default Setting	Example
system name [word]	Global Configuration mode	Determines the name string for the switch system.		<i>Switch (config)# system name xxx</i>
system location [word]	Global Configuration mode	Determines the location string for the switch system.		<i>Switch (config)# system location xxx</i>
system description [word]	Global Configuration mode	Determines the description string for the switch system.		<i>Switch (config)# system description xxx</i>
system contact [word]	Global Configuration mode	Determines the contact window string for the switch system.		<i>Switch (config)# system contact xxx</i>

Commands	Command Level	Description	Default Setting	Example
ip address [IP-address] [subnet-mask] ] [ gateway]	Global Configuration mode	Use the "ip address" command to define an IP address for a switch. Use the "no" form of this command to remove an IP address or to disable IP processing.		<i>Switch (config)# ip address 192.168.1.1 255.255.255.0 192.168.1.254</i>
write [memory] [terminal]	PrivilegedEXEC	The "write memory" command saves the configuration, and "write terminal" shows the entire configuration.		<i>Switch# write memory</i> <i>Update NVRAM to Flash Complete</i> <i>Switch# write terminal</i>
reload	Global Configuration mode	Stops all processes and performs a cold restart.		<i>Switch (config)# reload</i>
default	Global Configuration mode	Resets the system to the default settings.		<i>Switch (config)# default</i>
username [word]	Global Configuration mode	Changes the log-in user name (maximum 10 characters).		<i>Switch (config)# username xxxxxx</i>
password [word]	Global Configuration mode	Sets a password (maximum 10 characters).		<i>Switch (config)# password xxxxxx</i>
show accounting	PrivilegedEXEC	Displays user name and password.		<i>Switch# show accounting</i> <i>User name: admin</i> <i>password: funkwerk</i>

Commands	Command Level	Description	Default Setting	Example
show system-info	User EXEC	Displays system information.		<i>Switch&gt; show system-info</i> <i>Name: switch1</i> <i>location: lab</i> <i>Description: layer2 switch</i> <i>Contact: somewhere</i> <i>Serial NO: 1.00</i>
show ip	PrivilegedEXEC	Displays IP information.		<i>Switch# show ip address</i> <i>ip: 192.168.1.1</i> <i>Address subnet: 255.255.255.0</i> <i>Address gateway: 192.168.1.254</i>
show version	User EXEC	Use the "show version" User EXEC command to display version information for the hardware and firmware.		<i>Switch&gt; show version</i> <i>Firmware version: 1.0</i> <i>Hardware version: 3.0</i> <i>Kernel version: 1.10</i>

### Port Commands

Commands	Command Level	Description	Default Setting	Example
interface [FastEtherne t /module Ethernet] [slot id] [id]	Interface Configuration mode	Use the "Interface FastEthernet" command		<i>Switch (config)# interface fastethernet 0/1</i>
		Use the "module Ethernet" interface command		<i>Switch (config)# interface moduleEthernet 1/1</i>
duplex [full   half   auto]	Interface Configuration mode	Use the "duplex" command to set the duplex mode for the operation with Fast Ethernet.	Auto	<i>Switch (config)# interface fastEthernet 0/1 Switch (config- if)# duplex full</i>
		Use the "duplex" command to set the duplex mode for the operation with Module Ethernet.	Auto	<i>Switch (config)# interface moduleEthernet 1/1 Switch (config- if)# duplex full</i>
speed[10   100   auto]	Interface Configuration mode	Use the "speed" command to set the speed mode for the operation with Fast Ethernet.	Auto	<i>Switch (config)# interface fastEthernet 0/1 Switch (config- if)# speed 10</i>

Commands	Command Level	Description	Default Setting	Example
speed [10   100   1000   auto]	Interface Configuration mode	<p>Use the "speed" command to set the speed mode for the operation with Module Ethernet.</p> <ul style="list-style-type: none"> <li>■ The 100Base-FX module only supports the speed setting 100.</li> <li>■ The 1000Base-FX module only supports the speed settings 1000 &amp; auto.</li> </ul>		<i>Switch (config)# interface fastEthernet 1/2</i> <i>Switch (config-if)# speed 1000</i>
flowcontrol on / no flowcontrol	Interface Configuration mode	<p>Use the "flow control" command on Ethernet ports to control the data rate in the event of traffic jams.</p> <p>You can use the "no" form of this command to disable the flow control.</p>	On	<i>Switch (config)# interface fastEthernet 0/1</i> <i>Switch (config-if)# flowcontrol on</i>
security on or no security	Interface Configuration mode	<p>Use the "security" command on Ethernet ports.</p> <p>You can use the "no" form of this command to disable the security on the port.</p>	Disabled	<i>Switch (config)# interface fastEthernet 0/1</i> <i>Switch (config-if)# security on</i>

Commands	Command Level	Description	Default Setting	Example
priority on [high   low] or no priority	Interface Configuration mode	Use the "priority" command on Ethernet ports.  You can use the "no" form of this command to disable the priority on the port.	Disabled	<i>Switch (config)# interface fastEthernet 0/1 Switch (config-if)# priority on high</i>
Bandwidth [in   out] [value]	Interface Configuration mode	Sets the bandwidth for incoming or outgoing data traffic. The value range is (0-999). 0 means disabled. The bandwidth for the extension module (port 25 and 26) cannot be set.	Disabled	<i>Switch (config)# interface fastEthernet 0/1 Switch (config-if)# bandwidth in 50</i>
State [Enable   Disable]	Interface Configuration mode	Use the "state" command to set the state of the Ethernet ports. You can use this command in the disable variant to disable the port.	Enabled	<i>Switch (config)# interface fastEthernet 0/1 Switch (config-if)# state disable</i>
show interface configuration	Interface Configuration mode	Displays the status of the interface configuration.		<i>Switch (config)# interface fastEthernet 0/1 Switch (config-if)# show interface configuration</i>

Commands	Command Level	Description	Default Setting	Example
show interface status	Interface Configuration mode	Displays the current status of the interface.		<i>Switch (config)# interface fastEthernet 0/1 Switch (config-if)# show interface status</i>
show interface accounting	Interface Configuration mode	Displays the statistics counter of the interface.		<i>Switch (config)# interface fastEthernet 0/1 Switch (config-if)# show interface accounting</i>
show bandwidth	Interface Configuration mode	Displays the speed.		<i>Switch (config)# interface fastEthernet 0/1 Switch (config-if)# show bandwidth</i>
interface [FastEtherne t /module Ethernet] [slot id] [id]	Interface Configuration mode	Use the "Interface FastEthernet" command		<i>Switch (config)# interface fastEthernet 0/1</i>

### Trunk Commands

Commands	Command Level	Description	Default Setting	Example
show group [group-ID]	Privileged EXEC mode	Displays information on a trunk group. If you do not enter a trunk group number, all trunk groups will be displayed.		<i>Switch # show group 1Group Trunk.1:Ports: 02 03 04Priority: 0001LACP: EnableWork ports: 0</i>
port group [group-ID] [port-list] lacp [on   off] workp [work ports] no port group [group-ID] lacp [on   off] workp [work ports]	Global Configuration mode	Adds a trunk group. Use the "no" form of this command to delete trunk groups.	Disabled	<i>LACP:Switch (config)# port group 1 1-4 lacp on workp 2 Trunk without LACP:Switch (config)# port group 1 1-4 lacp off workp 4</i>
port group [group-ID] activityport [port ID]	Global Configuration mode	Activates the port for a trunk group.		<i>Switch (config)# port group 3 activityport 2-4 Trunk.1 Lacp: Enable Check OK! NEW: 2 4 Update finished!!</i>

### VLAN Commands

Commands	Command Level	Description	Default Setting	Example
vlan database	Privileged EXEC mode	Allows you to enter the VLAN configuration interface.		<i>Switch# vlan database</i> <i>Switch(vlan)#</i>
vlanmode [disable portbase 802.1q  gvrp]	VLAN Database mode	Allows you to set the VLAN mode of the switch. Use the "no" form of the command to restore the default setting.	Disabled	<i>Switch (vlan)# vlanmode 802.1q</i>
Port-Based VLAN				
vlan [Group Name] grpid [Group ID] port [Port ID]	VLAN Database mode	Adds a new, port-based VLAN.		<i>Switch (vlan)# vlan v2 grpid 2 port 1-4</i>
no vlan [Group Name] [Group ID]	VLAN Database mode	Deletes the port-based VLAN group.		<i>Switch (vlan)# no vlan v2</i>
show vlan [Group Name] [Group ID] or show vlan	VLAN Database mode	Displays the VLAN with the respective group name or group ID.		<i>Switch (vlan)# Show vlan v2</i>
vlan [Group name] add [port ID]	VLAN Database mode	Allows you to set the port of a specific port group.		<i>Switch (vlan)# vlan v2 add 5</i>
vlan [Group name] delete [port ID]	VLAN Database mode	Removes the port from the port group.		<i>Switch (vlan)# vlan v2 delete 5</i>

Commands	Command Level	Description	Default Setting	Example
802.1Q   802.1Q with GVRP VLAN Mode				
vlan [Group name] vlanid [group ID] port [port ID] tag [port ID]	VLAN Database mode	Adds a new 802.1Q VLAN [group name]:VLAN name [group ID]: 2-4094[port ID]:port members 1-9		<i>Switch(vlan)# vlan v2 vlanid 2 port 1-4tag 2-4</i>
vlan [group name] add [port ID] [tagged   untagged]	VLAN Database mode	Sets the port of a specific port group to tagged, resp. untagged.		<i>Switch(vlan)# vlan v2 add 5-8 taggedorvlan v2 add 5-8 untagged</i>
vlan [group name] delete [port ID]	VLAN Database mode	Removes the port from the port group.		<i>Switch (vlan)# vlan v2 delete 5</i>
no vlan [Group name] or [group ID]	VLAN Database mode	Deletes the 802.1Q VLAN group.		<i>Switch (vlan)# no vlan v2</i> <i>Switch (vlan)# no vlan v2 2</i>

Commands	Command Level	Description	Default Setting	Example
vlan protocol [group name] [protocol value]  vlanid [group ID] port [port ID] tag [port ID]	VLAN Database mode	Adds a VLAN protocol. [group name]: vlan group name IP-ip ARP-arp Appletalk-app Appletalk_AARP- app_arp Novell_IPX-ipx Banyan_vines- banyan_c4 Banyan_vines- banyan_c5 Banyan_vines- banyan_ad Decent_mop_01- decent_01 Decent_mop_02- decent_02 Decent_dpr-decent_dpr Decent_LAT-decent_lat Decent_LAVC- decent_lavc IBM SNA-ibm X.75 internet-x75 X.25 Layer3-x25 [VLAN ID]: 2 - 4094 [port ID]: port ID 1-10		<pre>Switch(vlan)# vlan protocol v3 ip vlanid 2 port 5-8 tag 6,8</pre> <pre>Switch(vlan)# vlan protocol v3 arp vlanid 2 port 5-8 tag 6,8</pre> <pre>Switch(vlan)# vlan protocol v3 banyan vlanid 2 port 5-8 tag 6,8</pre>

Commands	Command Level	Description	Default Setting	Example
vlanidrange [VLAN ID range]	VLAN Database mode	Allows you to set the VLAN ID range.  [1-255] range 0 [256-511] range 1 [512-767] range 2 [768-1023] range 3 [1024-1279] range 4 [1280-1535] range 5 [1536-1791] range 6 [1792-2047] range 7 [2048-2303] range 8 [2304-2559] range 9 [2560-2815] range 10 [2816-3071] range 11 [3072-3327] range 12 [3328-3583] range 13 [3584-3839] range 14 [3840-4094] range 15		
VLAN protocol [Group name] add [port ID] [tagged   untagged]	VLAN Database mode	Sets the port of a specific port group to tagged, resp. untagged.		<i>Switch (vlan)# vlan protocol v2 add 5 tagged</i>
VLAN protocol [Group name] delete [port ID]	VLAN Database mode	Removes the port from the port group.		<i>Switch (vlan)# vlan protocol v2 delete 5</i>

Commands	Command Level	Description	Default Setting	Example
show vlan [Group name] [Group ID] or show vlan	VLAN Database mode	Displays the VLAN with the respective group name or VLAN ID. vlanid: 1-4094		<i>Switch (vlan)# show vlan v2</i>
show vlan protocol	VLAN Database mode	Displays the VLAN protocol. Protocol ip ipx netbios		<i>Switch (vlan)# show vlan protocol</i>
port [port ID] pvid [port VID] ingressfilter1 [on   off] ingressfilter2 [on   off]	VLAN Database mode	Allows you to set the port PVID and the filter rules 1 and 2 for incoming data traffic.		<i>Switch (vlan)# port 2 pvid 2 ingressfilter1 off ingressfilter2 on</i>
show port [port ID]	VLAN Database mode	Allows you to display the port PVID and the filter rules 1 and 2 for incoming data traffic.		<i>Switch (vlan)# show port 2 Port ID: 2 Port Vid: 2 Ingress 1 Filter: Disable Ingress 2 Filter: Enable</i>

### Spanning Tree Commands

Commands	Command Level	Description	Default Setting	Example
show spanning-tree	User EXEC mode	Displays a summary of the Spanning Tree states.		<pre>Switch&gt; show spanning-tree System: Priority: 32768 Max Age: 20 Hello Time: 2 Forward Delay: 15 Priority: 32768 Mac Address: 004063800030 Root_Path_Cost: 0 Root Port: we are root Max Age: 20 Hello Time: 2 Forward Delay: 15</pre>
spanning-tree [on / off] or no spanning-tree	Global Configuration mode	Use the general Spanning Tree command to activate the Spanning Tree Protocol (STP).  Use the "no" form of this command to restore the default setting.	Disabled	<pre>Switch (config)# spanning-tree on or Switch (config)# no spanning-tree</pre>

Commands	Command Level	Description	Default Setting	Example
spanning-tree priority [number]	Global Configuration mode	Use the global Spanning Tree priority command to change the priority. Use the "no" form of this command to restore the default setting.	32768	<i>Switch (config)# spanning-tree priority 32767</i>
spanning-tree max-age [seconds]	Global Configuration mode	Use the global configuration command for Spanning Tree with maximum age to change the time intervals between which the Spanning Tree receives messages from the root switch. If the switch does not receive any BPDU (Bridge Protocol Data Unit) message from the root switch, it recalculates the topology of the Spanning Tree Protocol (STP). Use the "no" form of this command to restore the default setting.	20 sec	<i>Switch (config)# spanning-tree max-age 15</i>

Commands	Command Level	Description	Default Setting	Example
spanning-tree hello-time [seconds]	Global Configuration mode	Use the global Hello Time configuration command for Spanning Tree to set the time intervals between Hello BPDUs (Bridge Protocol Data Units). Use the "no" form of this command to restore the default setting.	2 sec.	<i>Switch (config)# spanning-tree hello-time 3</i>
stp-path-cost [number]	Interface Configuration mode	Use the stp path cost interface configuration command to determine the path costs for calculations according to the Spanning Tree Protocol (STP). If a loop is created, Spanning Tree uses the path costs to determine whether an interface is switched to forwarding mode.  Use the "no" form of this command to restore the default setting.	10 Mbps - 100 100 Mbps - 10	<i>Switch (config)# interface fastEthernet 0/2</i> <i>Switch (config-if)# stp-path-cost 20</i>

Commands	Command Level	Description	Default Setting	Example
spanning-tree forward-time [seconds]	Global Configuration mode	Use the global Forward Time configuration command for Spanning Tree to set the forwarding time for the specified Spanning Tree events. The forwarding time determines the duration of the listening and learning states before the port starts the forwarding. Use the "no" form of this command to restore the default setting.	15 sec.	<i>Switch (config)# spanning-tree forward-time 20</i>
stp-path-priority [number]	Interface Configuration mode	Use the Path Priority Interface command for Spanning Tree to configure the path priority. It is used when 2 switches compete for the root switch function. Use the "no" form of this command to restore the default setting.	128	<i>Switch (config)# interface fastEthernet 0/2</i> <i>Switch (config-if)# stp-path-priority 127</i>

### QoS Commands

Commands	Command Level	Description	Default Setting	Example
qos storm-control [5 10 15 20 25  off (%)] or no storm-control	Global Configuration mode	Enables / disables broadcast storm control. Use the "no" form of this command to restore the default setting.	Off	Switch (config)# qos storm-control 5
qos low-priority-delay-bound [on off] [sec.] or no qos low-priority-delay-bound	Global Configuration mode	Enables / disables low priority delay bound. Use the "no" form of this command to restore the default setting.	Off	Switch (config)# qos low-priority-delay-bound on 1
qos level [priority]	Global Configuration mode	[Priority] 0-7	0-3 LOW 4-7 HI	Switch (config)# qos level 2,3
no qos level [priority]	Global Configuration mode	[Priority] 0-7	0-3 LOW 4-7 HI	Switch (config)# no qos level 0-7

Commands	Command Level	Description	Default Setting	Example
<code>qos queuepolicy [Policy] hi [number] low [number]</code>	Global Configuration mode	[Policy]:fcfs: first in and first out wrr: weight round robin ahbl: all high before low. [Priority] Hi:1-7 Low:1	WRR Hi 2 Low 1	<i>WRR:</i> <i>Switch (config)# qos queuepolicy wrr hi 7 low 1</i> <i>First Come First Served:</i> <i>Switch (config)# qos queuepolicy fcfs</i> <i>All High before Low:</i> <i>Switch (config)# qos queuepolicy ahbl</i>
<code>qos bridge-delay-bound [sec.]</code> <code>no qos bridge-delay-bound</code>	Global Configuration mode	Use the QoS Bridge Delay Bound command. Use the "no" form of this command to restore the default setting.	Off	<i>Switch (config)# qos bridge-delay-bound 1</i>
<code>show qos storm-control</code>	Global Configuration mode	Displays broadcast storm control.		<i>Switch (config)# show qos storm-control</i> <i>QOS storm control mode: ENABLE</i>
<code>show qos policy</code>	Global Configuration mode	Displays the QoS policy.		<i>Switch (config)# show qos policy</i> <i>Qos Mode: WRR</i>

Commands	Command Level	Description	Default Setting	Example
show qos low-priority-delay-bound	Global Configuration mode	Displays low priority delay bound.		<i>Switch (config)# show qos low-priority-delay-bound Qos low priority delay bound: 1</i>
show qos bridge-delay-bound	Global Configuration mode	Displays bridge delay bound.		<i>Switch (config)# show qos bridge-delay-bound bridge-delay-bound 5</i>

### IGMP Commands

Commands	Command Level	Description	Default Setting	Example
igmp [on   off]	Global Configuration mode	Enables / disables the IGMP snooping function.	Off	<i>Switch (config)# igmp on</i>
igmp-query [auto   enable   disable]	Global Configuration mode	Changes the IGMP query mode.	Disabled	<i>Switch (config)# igmp-query enable</i>
show ip igmp profile	Privileged EXEC mode	Displays details of an IGMP profile entry.		<i>Switch# show ip igmp profile IP VID Port 224.1.1.1 10 1,2,6</i>

### MAC / Filter Table Commands

Commands	Command Level	Description	Default Setting	Example
mac-address-table aging-time [on   off] mac-address-table aging-time [sec.] or no mac-address-table aging-time	Global Configuration mode	The global MAC Address Table Aging Time configuration command allows you to define the duration that a dynamic entry remains in the MAC address table after it has been used or updated. Use the "no" form of this command to restore the default interval for the aging time. The aging time applies to all VLANs.	300 secs	<pre>Switch(config)# mac-address-table aging-time on Switch(config)# mac-address-table aging-time 333 (Disable)Switch(config)# mac-address-table aging-time off Or Switch(config)# no mac-address-table aging-time</pre>
mac-address-table table [static   filter] hwaddr [MAC address] vlanid [VLAN-ID]	Interface Configuration mode	Use the "MAC Address Table Static" command to add static entries to the MAC address table. Use the "MAC Address Table Filter" command to create a MAC address filter.	N/A	<pre>Switch(config)# interface fastEthernet 0/2 Switch(config-if)# mac-address-table static hwaddr 004063112233 vlanid 10</pre>

Commands	Command Level	Description	Default Setting	Example
no mac-address-table [static   filter] hwaddr [MAC address] vlanid [VLAN-ID]	Interface Configuration mode	Use the "No MAC Address Table [Static   Filter]" command to remove static entries or address filters from the MAC address table.		<i>Switch (config)# interface fastEthernet 0/2 Switch (config-if)# no mac-address-table static hwaddr 004063112233 vlanid 10</i>
show mac-address-table [static   filter]	Privileged EXEC mode	Use the "Show MAC Address Table" User EXEC command to display the MAC address table.		<i>Switch # show mac-address-table static</i>
show mac-address-table aging-time	Privileged EXEC mode			<i>Switch# show mac-address-table aging-time MAC Address aging-time: 300</i>

### SNMP Commands

Commands	Command Level	Description	Default Setting	Example
snmp system-name [word]	Global Configuration mode	Determines the system name of the SNMP agent.	N/A	<i>Switch (config)# snmp system-name I2switch</i>
snmp system-location [word]	Global Configuration mode	Determines the location of the SNMP agent.	N/A	<i>Switch (config)# snmp system-location lab</i>

Commands	Command Level	Description	Default Setting	Example
snmp system-contact [word]	Global Configuration mode	Determines the contact to the administrator of the SNMP agent.	N/A	Switch (config)# snmp system-contact where
snmp community-strings [word] right [RO   RW] Or no snmp community-strings [word]	Global Configuration mode	Adds SNMP community string. Use the "no" form of the command to delete the respective community.	PUBLIC RO	Switch (config)# snmp community-strings public right RW Switch(config)# no snmp community-strings public right rw
snmp-server host [IP-address] community [word] No snmp-server host [IP address] community [word]	Global Configuration mode	Configures host information and community string for the SNMP server.	N/A	Switch(config)# snmp-server host192.168.1.5 0 communitypublic Switch(config)# no snmp-server host 192.168.1.50 community public

### Port Mirroring Commands

Commands	Command Level	Description	Default Setting	Example
port monitor [RX TX both] [port ID]  Or no port monitor	Interface Configuration mode	Use the "Port Monitor" command to enable port monitoring on a port using Switch Port Analyzer (SPAN). Use the "no" form of this command to restore the default setting for the port.	N/A	Switch (config)# Interface fastEthernet 0/8 Switch (config-if)# port monitor both 3
show port monitor	Privileged EXEC mode	Use the "Show Port Monitor" Privileged EXEC command to display the ports with port monitoring via Switch Port Analyzer (SPAN) enabled.		Switch # show port monitor State: Enable AnalysisPortId: 8 Port 01 TxRx: Monitor Port 02 TxRx: Port 03 TxRx: Port 04 TxRx: Port 05 TxRx: Port 06 TxRx: Port 07 TxRx: Port 08 TxRx: Analysis Port 09 TxRx: Port 10 TxRx:OK.

### 802.1x Commands

Commands	Command Level	Description	Default Setting	Example
show 8021x	User EXEC mode	Displays a summary of the features of 802.1 and of the port states.	N/A	Switch> show 8021x
8021x [on   off] or no 8021x	Global Configuration mode	Use the global 802.1x configuration command to enable 802.1x protocols.  Use the "no" form of this command to restore the default setting.	Disabled	Switch (config)# 8021x on
8021x system radiusip [IP address] Or no 8021x system radiusip	Global Configuration mode	Use the global configuration command 802.1x System Radius IP to change the IP address of the radius server.  Use the "no" form of this command to restore the default setting.	192.168.0.3	Switch (config)# 8021x system radiusip 192.168.1.1 (Default)Switch (config)# no 8021x system radiusip
8021x system sharekey [number] Or no 8021x system sharekey	Global Configuration mode	Use the global 802.1x System Sharekey configuration command to change the parameter for the shared key.  Use the "no" form of this command to restore the default setting.	12345678	Switch (config)# 8021x system sharekey 123456 (Default)Switch (config)# no 8021x system sharekey
8021x system serverport [Port Number]	Global Configuration mode	Allows you to set the radius server port.	1812	Switch (config)# 8021x system serverport 1815

Commands	Command Level	Description	Default Setting	Example
8021x system accountport [Port Number]	Global Configuration mode	Allows you to set the accounting port.	1813	<i>Switch (config)# 8021x system accountport 1816</i>
8021x system nasid [word]	Global Configuration mode	Allows you to set the NAS ID.	NAS_L2_SWI TCH	<i>Switch (config)# 8021x system nasid test1</i>
8021x misc quietperiod [sec.] Or no 8021x misc quietperiod	Global Configuration mode	Use the global 802.1x Misc Quiet Period configuration command to set the parameter for the quiet period of the switch.  Use the "no" form of this command to restore the default setting.	60 sec.	<i>Switch (config)# 8021x misc quietperiod 10 (Default)</i> <i>Switch(config)# no 8021x misc quietperiod</i>
8021x misc txperiod [sec.] Or no 8021x txperiod	Global Configuration mode	Use the global 802.1x Misc TX Period configuration command to set the TX period.  Use the "no" form of this command to restore the default setting.	30 sec.	<i>Switch (config)# 8021x misc txperiod 5 (Default)</i> <i>Switch(config)# no 8021x misc txperiod</i>
8021x misc supptimeout [sec.]	Global Configuration mode	Determines the period of time the switch waits for a supplicant to reply to an EAP request.	30 sec.	<i>Switch (config)# 8021x misc supptimeout 30</i>
8021x misc servertimeout [sec.]	Global Configuration mode	Determines the period of time the switch waits for the server to reply to an authentication request.	30 sec.	<i>Switch (config)# 8021x misc servertimeout 50</i>

Commands	Command Level	Description	Default Setting	Example
8021x misc maxrequest [Number]	Global Configuration mode	Defines the number of authentication attempts after which the authentication will be regarded as failed and the authentication session will be terminated.	2	<i>Switch (config)# 8021x misc maxrequest 2</i>
8021x misc reauthperiod [sec.]	Global Configuration mode	Determines the period of time after which the connected clients have to be re-authenticated.	3600	<i>Switch(config)# 8021x misc reauthperiod 20</i>

Commands	Command Level	Description	Default Setting	Example
8021x prostate [reject   accept   authorize   disable]	Interface Configuration mode	<p>Use the 802.1x Port State command to set the state of the selected port.</p> <ul style="list-style-type: none"> <li>■ Reject: The specified port has to remain in an unauthorized state.</li> <li>■ Accept: The specified port has to remain in an authorized state.</li> <li>■ Authorized: The specified port is either set to the "authorized" or "unauthorized" state. The state depends on the result of the authentication process which is performed between the supplicant and the authentication server.</li> <li>■ Disable: The specified port has to remain in an authorized state.</li> </ul>	N/A	<pre>Switch (config)# interface fastethernet 0/3 Switch (config-if)# 8021x portstate accept</pre>

### TFTP Commands

Commands	Command Level	Description	Default Setting	Example
copy flash:config .text tftp [TFTP IP address] [file name]	Global Configuration mode	Command used to create a backup of the configuration file		<i>Switch (config)# copy flash:config.text tftp Server IP:192.168.1.1 Image Filename:backu p.dat</i>
tftp:config. text flash [TFTP IP address] [file name]	Global Configuration mode	Command used to restore the configuration file		<i>Switch(config)# Tftp:config.text flash Server IP:192.168.1.1Im age Filename:restore .dat</i>
tftp:firmwar e flash [TFTP IP address] [file name]	Global Configuration mode	Command used to update the firmware		<i>Switch (config)# Tftp:firmware flash Server IP:192.168.1.1 Image Filename:image. bin</i>

### Commands for the Uninterruptible Power Supply (UPS)

Commands	Command Level	Description	Default Setting	Example
status	UPS mode	Displays a status summary of the uninterruptible power supply.		<i>Switch (ups)#status Input Output Voltage.....</i>
Info	UPS mode	Displays information on the uninterruptible power supply.		<i>Switch (ups)# info Company Name :xxx Model :xxx Version :xxx</i>
Test 10	UPS mode	A self-test of the uninterruptible power supply is carried out, which lasts 10 seconds.		<i>Switch (ups)# test10 test OK</i>

### POE Commands

Commands	Command Level	Description	Default Setting	Example
status	POE mode	Displays POE information.		<i>Switch(poe)# status</i>
setpm [on   off]	POE mode	Enables or disables the power management.		<i>Switch(poe)# setpm on Set Power Management Enable</i>

Commands	Command Level	Description	Default Setting	Example
setlimit [value]	POE mode	Enables or disables the maximum power output setting. If this function is enabled, the overall power output is controlled by the "portplm" parameter.		<i>Switch(poe)# setlimit 100</i>
porteb1 [enable   disable] [ports]	POE mode	Enables or disables the POE injector functionality.		<i>Switch(poe)# porteb1 disable 1-3</i>
portcls [enable   disable] [ports]	POE mode	Enables or disables the port power limit through classification.		<i>Switch(poe)# portcls enable 1-3</i>
portmng [enable   disable] [ports]	POE mode	Enables or disables the port power limit through management.		<i>Switch(poe)# portmng enable 2-5</i>
portleg [enable   disable] [ports]	POE mode	Enables or disables port legacy detection.		<i>Switch(poe)# portleg enable 3-6</i>
portpri [critical   high   low] [ports]	POE mode	Sets the port priority for power supply management.		<i>Switch(poe)# portpri critical 2</i>
portplm [value] [ports]	POE mode	Allows you to set the maximum power output for each port.		<i>Switch(poe)# portplm 12200 5-7</i>

### System Log Commands

Commands	Command Level	Description	Default Setting	Example
show systemlog	User EXEC	Displays the system log.		<i>Switch&gt; show systemlog</i>
show systemlog	Privileged EXEC	Displays the system log client and the server information.		<i>switch# show systemlog</i> <i>Syslog Client: Enable</i> <i>Syslog Server Ip: 192.168.0.2</i>
systemlog ip [IP address]	Global Configuration mode	Sets the IP address of the system log server.		<i>Switch(config)# systemlog ip 192.168.1.100</i>
systemlog [enable   disable]	Global Configuration mode	Enables or disables the system log mode.		<i>Switch(config)# systemlog enable</i>

### SNTP Commands

Commands	Command Level	Description	Default Setting	Example
sntp [enable   disable]	Global Configuration mode	Activates / disables SNTP.	Disabled	<i>Switch(config)# sntp enable</i> <i>Switch(config)# sntp disable</i>
sntp ip [IP address]	Global Configuration mode	Determines the IP address of the SNTP server.		<i>switch#sntp ip 192.168.0.123</i>
sntp timezone [value]	Global Configuration mode	Determines the time zone.		<i>Switch(config)# sntp timezone 8</i>

## 4.5 Working with the Menus

After logging on to the system, you will be prompted to enter a command.

To get to the menu interface, enter the `menu` command. The main menu appears. The default user name is `admin`, and the default password is `funkwerk`.

There are 8 menus available:

- **STATUS AND COUNTERS:** Displays the status of the switch.
- **SWITCH CONFIGURATION:** Serves to configure the switch.
- **PROTOCOL RELATED CONFIGURATION:** Serves to configure the protocol functionality.
- **SYSTEM RESET CONFIGURATION:** Serves to restart the system and to restore the default configuration of the switch.
- **POWER MENU:** Serves to configure the uninterruptible power supply (UPS).
- **POE MENU:** Serves to configure the POE functionality.
- **SAVE CONFIGURATION:** Saves the current configuration in the system memory.

- **Logout:** Closes the menu interface.

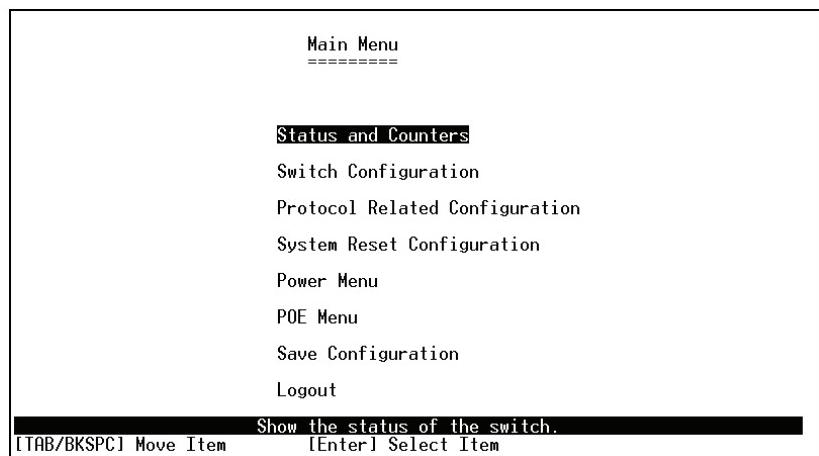


Figure 4-3: Main menu

- Description of the function keys:

The function keys can be used in all the menus:

- **TAB / BACKSPACE KEY:** Moves your cursor to get you to the menu item you want to configure.
- **ENTER:** Selects a menu item.
- **SPACE KEY:** Changes the setting of selected menu items.
- **Esc:** Cancels the current work mode.

## 4.5.1 Status and Counters

Allows you to display port status and counters and lets you configure the system parameters.

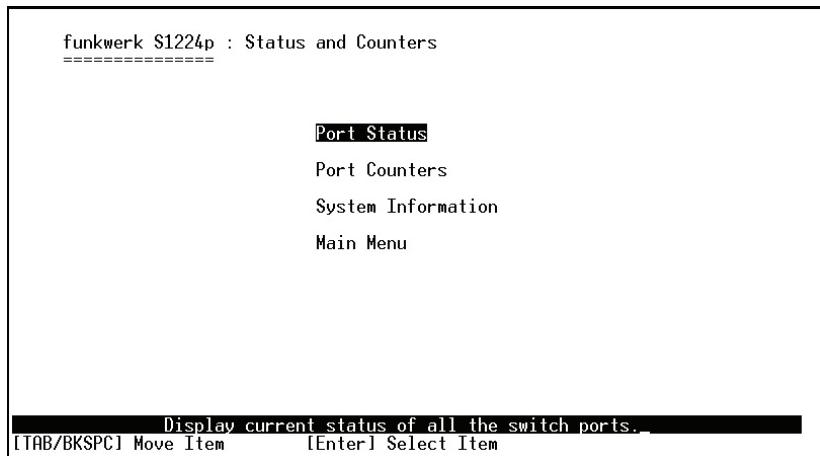


Figure 4-4: Configuration interface for status and counters

**Port Status** Displays the status of each port.

- **TYPE:** Specifies the data rate on this port.
- **LINK:** Displays the connection status of the port. If there is currently a connection from the port to the device which is up and running normally, "UP" is displayed here. Otherwise, "Down" is displayed.
- **STATE:** Current port status.
- **NEGOTIATION:** Displays the auto-negotiation status.
- **SPEED DUPLEX:** Displays the duplex mode of the port.
- **FC:** Displays the flow control status.
- **BP:** Displays the back pressure status.

- **BANDWIDTH In/Out:** Displays the bandwidth control status for incoming / outgoing traffic.
- **PRIORITY:** Displays the port priority status.
- **SECURITY:** Displays the port security status.

funkwerk S1224p : Port Status											
Port	Type	Link	State Negotiation	Speed Duplex	FC	BP	Band Width In	Out	Security Priority		
Port.01	100TX	Down	Enable Auto	100 Full	ON	OFF	OFF	OFF	Disable	OFF	
Port.02	100TX	Up	Enable Auto	100 Full	ON	OFF	OFF	OFF	Disable	OFF	
Port.03	100TX	Down	Enable Auto	100 Full	ON	OFF	OFF	OFF	Disable	OFF	
Port.04	100TX	Down	Enable Auto	100 Full	ON	OFF	OFF	OFF	Disable	OFF	
Port.05	100TX	Down	Enable Auto	100 Full	ON	OFF	OFF	OFF	Disable	OFF	
Port.06	100TX	Down	Enable Auto	100 Full	ON	OFF	OFF	OFF	Disable	OFF	
Port.07	100TX	Down	Enable Auto	100 Full	ON	OFF	OFF	OFF	Disable	OFF	
Port.08	100TX	Down	Enable Auto	100 Full	ON	OFF	OFF	OFF	Disable	OFF	

Actions-> <Previous Page> <Next Page> <Quit>  
 Select the action menu.  
 [TAB/BKSPC] Move Item [Enter] Select Item [Esc] Previous Menu

Figure 4-5: Port status interface

**Port Counters** Displays current port counter information.

- **<REFRESH>:** Refreshes the counter information.
- **<CLEAR>:** Sets all port counters to 0.
- **<NEXT PAGE>:** Jumps to the next page.

- <PREVIOUS PAGE>: Jumps back to the previous page.

funkwerk S1224p : Port Counters							
Port	Type	Tx Good Packet	Tx Bad Packet	Rx Good Packet	Rx Bad Packet	Tx Abort Packet	Packet Collision
Port.01	Auto	0	0	0	0	0	0
Port.02	Auto	163	0	711	1	0	0
Port.03	Auto	0	0	0	0	0	0
Port.04	Auto	0	0	0	0	0	0
Port.05	Auto	0	0	0	0	0	0
Port.06	Auto	0	0	0	0	0	0
Port.07	Auto	0	0	0	0	0	0
Port.08	Auto	0	0	0	0	0	0

Actions-> <Refresh> <Clear> <Previous Page> <Next Page> <Quit>  
 Configure the action menu.  
 [TAB/BKSPC] Move Item [Enter] Select Item [Esc] Previous Menu

Figure 4-6: Port counter information interface

**System Information** Displays the system parameters.

- **SYSTEM NAME:** Name of the device
- **SYSTEM LOCATION:** Specifies where the device is located.
- **SYSTEM DESCRIPTION:** Specifies the device type.
- **FIRMWARE VERSION:** Indicates the firmware version of the switch.
- **HARDWARE VERSION:** Indicates the hardware version of the switch.
- **KERNEL VERSION:** Indicates the kernel version of the system.
- **MAC ADDRESS:** Indicates the unambiguous hardware address, which is assigned by default by the manufacturer.

- **MODULE INFORMATION:** Displays information on the installed module.

```
funkwerk S1224p : System Information
=====
System Name      :
System Location   :
System Description: funkwerk S1224p

Firmware Version : v1.03
Kernel Version   : v17.07
Hardware Version : A7.00
MAC Address       : 00A0F9161100

Module    Type     Description
-----
Port 25  Auto     1000TX Copper/1000FX MiniGBIC
Port 26  Auto     1000TX Copper/1000FX MiniGBIC

Actions-> <Quit> Display the switch system information.
[TAB/BKSPC] Move Item [Enter] Select Item [Esc] Previous Menu
```

Figure 4-7: System information interface

## 4.5.2 Switch Configuration

There are 8 functions available: Administration, Port, Trunk, Port Mirroring, VLAN, Priority, MAC Address, and Misc Configuration.

```
funkwerk S1224P : Switch Configuration
=====
Administration Configuration
Port Configuration
Trunk Configuration
Port Mirroring Configuration
VLAN Configuration
Priority Configuration
MAC Address Configuration
Misc Configuration
Main Menu
Configure the system, IP, and password.
[TAB/BKSPC] Move Item [Enter] Select Item
```

Figure 4-8: Switch configuration interface

**Administration Configuration** Allows you to configure system parameters, IP, log-in user name, password, and SNTP.

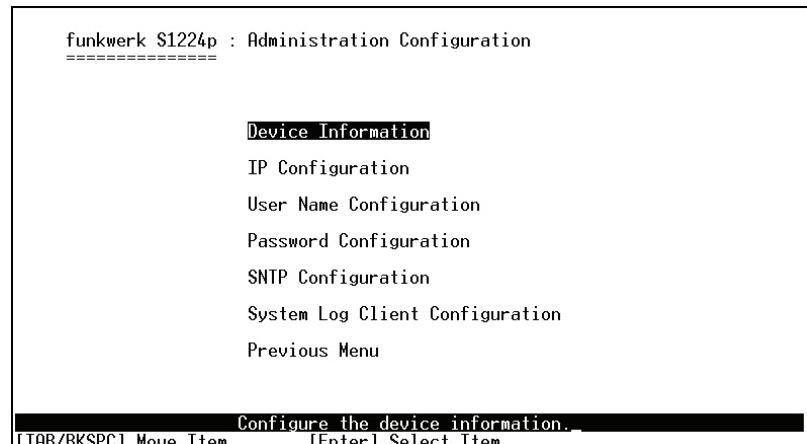


Figure 4-9: Administration Configuration main menu

### Device Information

Serves to configure the device parameters.

- Select <Edit> to change a configuration.
- **NAME:** Assign a name to the switch.
- **DESCRIPTION:** A short description of the switch.
- **LOCATION:** Location of the switch, e. g. Nuremberg
- **CONTACT:** Contact partner or related information.

- Select <Apply> to apply the configuration.

```
funkwerk S1224p : Device Information  
=====
```

Name :  
Description : funkwerk S1224p  
Location :  
Contact :

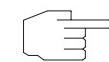
```
Actions->  <Edit>  <Apply>  <Quit>  
[TAB/BKSPC] Move Item  [Enter] Select Item  [Esc] Previous Menu
```

Figure 4-10: Device information interface

## IP Configuration

Serves to configure the IP address of the switch.

- Select <Edit>.
- **DHCP CLIENT:** Select *Enable* to be assigned an IP address by the DHCP server. For the opposite option, select *Disable*. The DHCP client function works only if the switch has not been assigned a static IP address other than the default IP address. If the default IP address has been changed, DHCP is no longer effective, and the switch will go on using the static IP address assigned by the user.
- **IP ADDRESS:** Assign the IP address for the switch (the default is 192.168.0.248).
- **SUBNET MASK:** Assign an IP subnet mask to the switch.
- **GATEWAY:** Assign a gateway to the switch (the default is 0.0.0.0).
- Select <Apply> to apply the configuration.



Always restart the switch after changing the IP address.

**Note**

```
funkwerk S1224p : IP Configuration
=====
DHCP Client : Disable
IP Address   : 192.168.0.248
Subnet Mask  : 255.255.255.0
Gateway      : 192.168.0.254

Actions-> <Edit> <Apply> <Quit>
Select the action menu.
[TAB/BKSPC] Move Item [Enter] Select Item [Esc] Previous Menu
```

Figure 4-11: IP configuration interface

### User Name Configuration

You can use this menu item to change the user name for console and Web management log-on.

- Select **<Edit>**.
- Enter the new user name.

- Select <Apply> to apply the configuration.

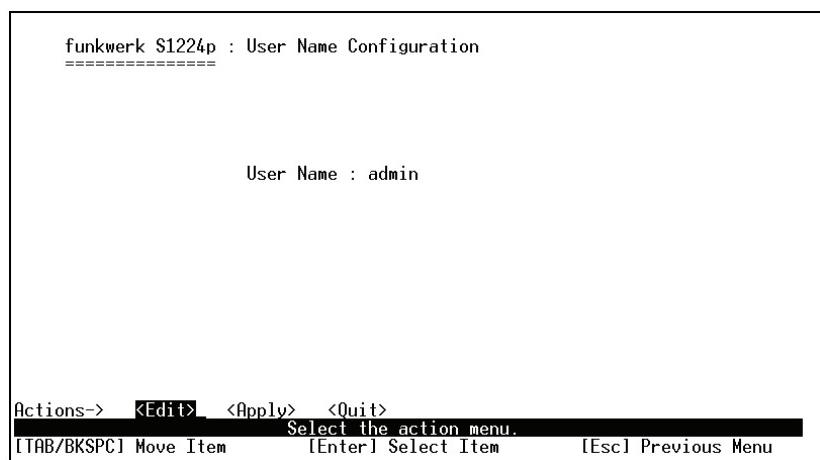


Figure 4-12: User name configuration interface

### Password Configuration

You can use this menu item to change the password for console and Web management log-on.

- Select <Edit>.
- **OLD PASSWORD:** Enter your old password.
- **NEW PASSWORD:** Enter a new password.
- **ENTER AGAIN:** Enter the new password again to confirm it.

- Select <Apply> to apply the configuration.

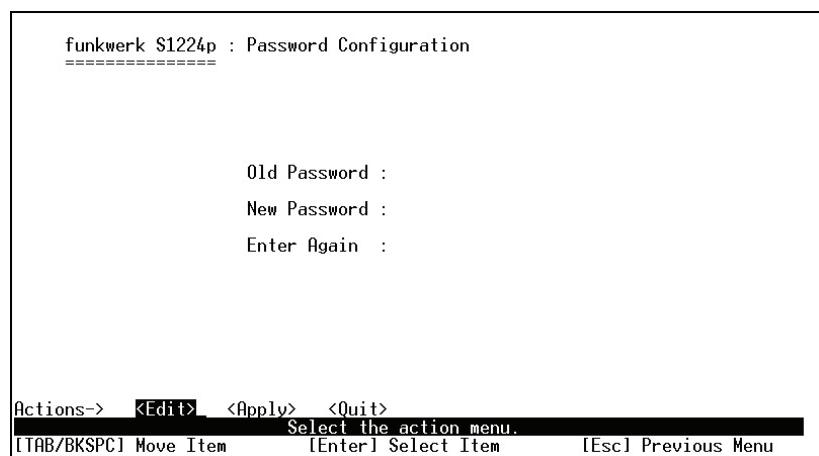


Figure 4-13: Password configuration interface

**SNTP Configuration** This menu item serves to configure the SNTP (Simple Network Time Protocol) settings, which the switch can use to synchronize its clock over the Internet.

- **SNTP CLIENT:** Enables or disables the SNTP function which is used to query a clock synchronization from the SNTP server.
- **UTC TIMEZONE:** Determines the local time zone in which the switch is working.

- **SERVER IP:** Determines the IP address of the SNTP server.

funkwerk S1224p : SNTP Configuration  
=====

SNTP Client : Disable  
UTC Timezone: 0  
Server IP : 192.168.0.2

Actions-> <Edit> <Apply> <Quit>  
[TAB/BKSPC] Move Item [Enter] Select Item [Esc] Previous Menu

Figure 4-14: SNTP configuration interface

- |  |   |
|--|---|
| <b>System Log Client Configuration</b> | Configures the switch as the system log client, which can query system log information from the system log server. <ul style="list-style-type: none"><li>■ Select <b>&lt;Edit&gt;</b>.</li><li>■ <b>CLIENT MODE:</b> Enables or disables the system log client function.</li><li>■ <b>SERVER IP:</b> Assign an IP address to the system log server.</li></ul> |
|--|---|

- Select <Apply> to apply the configuration.

funkwerk S1224P : System Log Client Configuration  
=====

Client Mode : Disable  
Server IP : 192.168.0.2

Actions-> <Edit> <Apply> <Quit>  
[TAB/BKSPC] Move Item [Enter] Select Item [Esc] Previous Menu

The screenshot shows a terminal window titled "funkwerk S1224P : System Log Client Configuration". It displays two lines of configuration: "Client Mode : Disable" and "Server IP : 192.168.0.2". At the bottom, there is a menu bar with options: "Actions->" followed by "<Edit> <Apply> <Quit>". Below this menu, there are three command-line style options: "[TAB/BKSPC] Move Item", "[Enter] Select Item", and "[Esc] Previous Menu". The "Select the action menu." part of the menu bar is highlighted with a black rectangle.

Figure 4-15: System log client configuration interface

**Port Configuration** Serves to configure the individual ports.

- Select <Edit>.
- Use the **tab / backspace key** to move from one menu item to the next.
- **TYPE:** Specifies the data rate on this port.
- **STATE:** Current port status: The port can be set to the enabled or disabled mode. If the port is disabled, no packets will be received on or transferred from this port.
- **NEGOTIATION:** This item serves to determine the auto-negotiation status on this port.
- **SPEED/DUPLEX:** Lets you specify the speed on the port connection and the duplex mode.
- **FC:** Lets you enable or disable flow control (flow control for full duplex link mode).
- **BP:** Lets you enable or disable the back pressure function (back pressure for half-duplex mode).

- **BANDWIDTH In/Out:** Lets you control the data rate for each port. Can be set in increments of 100 kbps. The TX and RX options can be used for individual control purposes.
- **PRIORITY:** Lets you assign high or low priority to the packets on the port.
- **SECURITY:** Lets you enable or disable the security function on the port.
- Select <Apply> to apply the configuration.

funkwerk S1224p : Port Configuration										
Port	Type	Negotiation State	Speed Duplex	FC	BP	Band In	Width Out	Security	Priority	
Port.01	100TX	Enable	Auto	100 Full	ON	OFF	0	0	Disable	OFF
Port.02	100TX	Enable	Auto	100 Full	ON	OFF	0	0	Disable	OFF
Port.03	100TX	Enable	Auto	100 Full	ON	OFF	0	0	Disable	OFF
Port.04	100TX	Enable	Auto	100 Full	ON	OFF	0	0	Disable	OFF
Port.05	100TX	Enable	Auto	100 Full	ON	OFF	0	0	Disable	OFF
Port.06	100TX	Enable	Auto	100 Full	ON	OFF	0	0	Disable	OFF
Port.07	100TX	Enable	Auto	100 Full	ON	OFF	0	0	Disable	OFF
Port.08	100TX	Enable	Auto	100 Full	ON	OFF	0	0	Disable	OFF

Actions->    <Edit>    <Apply>    <Previous Page>    <Next Page>    <Quit>  
 [TAB/BKSPC] Move Item    [Enter] Select Item    [Esc] Previous Menu

Figure 4-16: Port configuration interface

**Trunk Configuration** Serves to configure port trunk groups.

- Select <Edit>.
- Use the **tab** key to go to the port you want to add to a trunk group.
- Use the **space key** to select the port.
- Use the **tab** key to select the **trunk** and to change the trunk parameter to *Static, LACP* or *Disable*.

- Select <Apply> to apply the configuration.

```
funkwerk S1224p : Trunk Configuration
=====
  01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
T1 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
T2 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
T3 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
T4 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
T5 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
T6 . . . . . . . . . . . . . . . . . . . . . . . . . . . .
T7 . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Trunk 1: Disable
Trunk 2: Disable
Trunk 3: Disable
Trunk 4: Disable
Trunk 5: Disable
Trunk 6: Disable
Trunk 7: Disable

Actions-> <Edit> <Apply> <Quit>
Select the action menu.
[TAB/BKSPC] Move Item [Enter] Select Item [Esc] Previous Menu
```

Figure 4-17: Trunk configuration interface

**Port Mirroring Configuration** Port mirroring is a method to monitor the data traffic in switched networks. The individual ports can monitor the data traffic through the mirrored ports. The incoming or outgoing data traffic of the monitored ports is duplicated in the monitoring ports.

- Select <Edit>.
- **MIRRORING STATE:** Select the Port Mirroring mode to start port mirroring (disabled by default).
  - **RX:** RX packets only
  - **TX:** TX packets only

- **Both:** RX and TX packets

```
funkwerk S1224p : Port Mirroring
=====
Mirroring State : Disable

Actions->  <Edit>  <Apply>  <Quit>
Select the action menu.
[TAB/BKSPC] Move Item  [Enter] Select Item  [Esc] Previous Menu
```

Figure 4-18: Port mirroring interface

- **ANALYSIS PORT:** Sets the destination port of the mirroring packet. All packets of the mirrored port are duplicated and sent to the analysis port.
- **PORT STATE:** Select the port you wish to mirror.
- Use the **space key** to select the port to be mirrored.

- Select <Apply> to apply the configuration.

```
funkwerk S1224p : Port Mirroring
=====
Mirroring State : Both
Analysis Port : Port.01
Port State      Port State      Port State      Port State
Port.01 -        Port.09 -        Port.17 -        Port.25 -
Port.02 -        Port.10 -        Port.18 -        Port.26 -
Port.03 -        Port.11 -        Port.19 -
Port.04 -        Port.12 -        Port.20 -
Port.05 -        Port.13 -        Port.21 -
Port.06 -        Port.14 -        Port.22 -
Port.07 -        Port.15 -        Port.23 -
Port.08 -        Port.16 -        Port.24 -
```

Actions-> <Edit> <Apply> <Quit>
Select the action menu.
[TAB/BKSPC] Move Item [Space] Toggle [Esc] Previous Menu

Figure 4-19: Port mirroring interface

#### VLAN Configuration Configuring VLAN groups

```
funkwerk S1224p : VLAN Configuration
=====
```

VLAN Configure  
Create VLAN Group  
Edit/Delete VLAN Group  
Group Sorted Mode  
Previous Menu

Configure VLAN mode and ingress, egress rule.
[TAB/BKSPC] Move Item [Enter] Select Item [Esc] Previous Menu

Figure 4-20: VLAN Configuration main menu

## VLAN Configure

Select the VLAN mode to enable the VLAN functionality.

- Select <Edit>.
- Select the VLAN mode by pressing the **tab** key. There are two VLAN modes: PortBase and 802.1Q. In VLAN mode **802.1Q**, the following settings have to be configured: **VLAN ID**, **INGRESS FILTER**, and **ACCEPTABLE FRAME TYPE**.
  - **VLAN ID RANGE**: Enter the PVID. The PVID only applies to incoming packets, not to all packets.
  - **INGRESS FILTER**: This filter for incoming packets corresponds to filter rule 2 in the Web and serves to discard or forward untagged frames. Press the **space key** to select whether you want to discard or forward untagged frames.
  - **ACCEPTABLE FRAME TYPE**: Corresponds to ingress filter rule 1 in the Web. Packets will be forwarded only if they have the same VID as the port. Press the **space key** to select the acceptable frame type.
- Select <Apply> to apply the configuration.



If you have changed the VLAN mode, you will have to restart the switch.

### Note

```
funkwerk S1224p : VLAN Configure
=====
VLAN Mode : 802.10
VLAN ID Range : 1~255

Port     VLAN ID    Ingress Filter   Acceptable Frame Type
-----+-----+-----+-----+
Port.01  1           Enable          All
Port.02  1           Enable          All
Port.03  1           Enable          All
Port.04  1           Enable          All
Port.05  1           Enable          All
Port.06  1           Enable          All
Port.07  1           Enable          All
Port.08  1           Enable          All

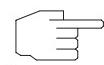
Actions->  <Edit>  <Apply>  <Previous Page>  <Next Page>  <Quit>
Select the Action menu.
[TAB/BKSPC] Move Item  [Space] Toggle  [Esc] Previous Menu
```

Figure 4-21: VLAN Configure interface

### Create VLAN Group

Allows you to create a port-based VLAN.

- Select **<Edit>**.
- **VLAN NAME:** Enter a name for the new VLAN (e. g. VLAN01).
- **GROUP ID:** Enter the VLAN group ID.
- **MEMBER:** Press the **space key** to modify the member parameter. There are two types:
  1. **MEMBER:** The port is a member port.
  2. **NO:** The port is NOT a member port.
- Press the **Esc** key to return to the next-highest menu.
- Select **<Apply>** to apply the configuration.

**Note**

When you have finished configuring the trunk groups, they will appear in the port list (e. g. Trunk1, Trunk2, ...). You can also configure the trunk group as a VLAN member.

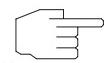
```
funkwerk S1224p : Create VLAN Group
=====
VLAN Name :           VLAN ID :
Protocol VLAN : None
Port          Member
-----
Port.04        No
Port.05        No
Port.06        No
Port.07        No
Port.08        No
Port.09        No
Port.10        No
Port.11        No

Actions->  <Edit>  <Apply>  <Previous Page>  <Next Page>  <Quit>
[TAB/BKSPC] Move Item  [Enter] Select Item  [Esc] Previous Menu
Select the Action menu.
```

Figure 4-22: Create VLAN Group interface: PortBase

### Creating an 802.1Q VLAN

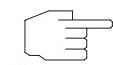
1. **ENABLE SECURITY VLAN SETTING:** This option allows you to enable or disable the security VLAN. If you enable the security VLAN, the switch can be accessed only by members of this VLAN. To configure the security VLAN, please perform steps 2-8 below. After finishing this configuration, you can create more VLANs. If you do not want to enable the security VLAN, directly perform steps 2-8 to create other VLANs.

**Note**

You can create only one security VLAN.

```
funkwerk S1224P : Create VLAN Group
=====
VLAN Name :          VLAN ID :
Do you want to enable security VLAN setting (y/N)_
```

2. Select <**Edit**>.
3. **VLAN NAME**: Enter a name for the new VLAN (e. g. VLAN01).
4. **VLAN ID**: Enter a VID. There are 256 configurable VLAN groups (the default is 1).
5. **PROTOCOL VLAN**: Press the **space key** to select the protocol type.
6. **MEMBER**: Press the **space key** to modify the member parameter.
  - **UNTAGGED**: The port belongs to this VLAN group, and outgoing frames are NOT VLAN-tagged.
  - **TAGGED**: The port belongs to this VLAN group, and outgoing frames are VLAN-tagged.
  - **NO**: The port does NOT belong to this VLAN group.
7. Press the **Esc** key to return to the next-highest menu.
8. Select <**Apply**> to apply the configuration.

**Note**

When you have finished configuring the trunk groups, they will appear in the port list (e. g. Trunk1, Trunk2, ...). You can also configure the trunk group as a VLAN member.

```
funkwerk S1224p : Create VLAN Group
=====
VLAN Name : Security_VLAN      VLAN ID : 255
Protocol VLAN : None
Port          Member
-----
Port.01        UnTagged
Port.02        UnTagged
Port.03        UnTagged
Port.04        UnTagged
Port.05        UnTagged
Port.06        UnTagged
Port.07        UnTagged
Port.08        UnTagged
Actions->  <Edit>   <Apply>   <Previous Page>  <Next Page>  <Quit>
Select the Action menu.
[TAB/BKSPC] Move Item  [Enter] Select Item  [Esc] Previous Menu
```

Figure 4-23: 802.1Q VLAN creation interface

### Edit / Delete VLAN Group

Allows you to edit and delete VLAN groups.

- Select **<Edit>** or **<Delete>**.
- Select the VLAN group you want to edit or delete.
- Press the **Enter** key.
- In **<Edit>** mode, you can modify member ports or delete them from this VLAN group.

**Note**

1. VLAN name and VLAN ID cannot be changed.
2. In 802.1Q VLAN mode, you cannot delete the default VLAN.
3. In port-based VLAN mode, there is no default VLAN.

Name	VLAN ID	Name	VLAN ID
DEFAULT	1		

Actions-> <Edit> <Delete> <Previous Page> <Next Page> <Quit>  
[TAB/BKSPC] Move Item [Enter] Select Item [Esc] Previous Menu

Figure 4-24: Edit / Delete VLAN Groups interface

### Group Sorted Mode

To specify the sorting criterion for the VLAN groups, select "Group Sorted Mode". The result will then be displayed on the "Edit / Delete a VLAN group" page.

- Select <Edit>.
- Press the **space key** to sort by **NAME** or **VLAN ID**.

- Select <Apply> to apply the configuration.

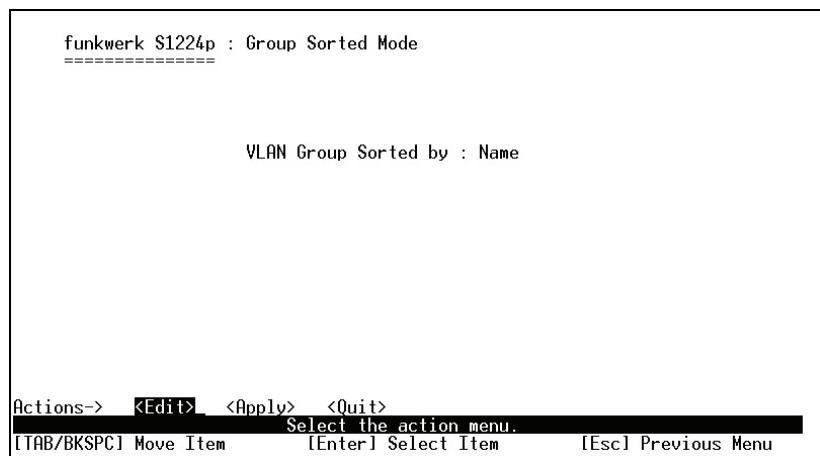


Figure 4-25: Group sorting interface

**Priority Configuration** Allows you to configure the priority level of each port. The priority levels 0-7 are available. Each can be assigned to the queue with high or low priority.

- Select <Edit>.
- Press the **space key** to assign the desired priority (high or low).
- **Qos MODE:** Lets you specify the processing sequence of packets with high and low priority.
  - **FIRST COME FIRST SERVICE:** The first packet to be processed by the switch will be the one that comes first.
  - **ALL HIGH BEFORE LOW:** Packets with high priority will always be processed before packets with low priority.
  - **WEIGHT ROUND RATION 2:1:** The switch will process 2 high priority packets first, then 1 low priority packet.
  - **WEIGHT ROUND RATION 3:1:** The switch will process 3 high priority packets first, then 1 low priority packet.
  - **WEIGHT ROUND RATION 4:1:** The switch will process 4 high priority packets first, then 1 low priority packet.

- **WEIGHT ROUND RATION 5:1:** The switch will process 5 high priority packets first, then 1 low priority packet.
- **WEIGHT ROUND RATION 6:1:** The switch will process 6 high priority packets first, then 1 low priority packet.
- **WEIGHT ROUND RATION 7:1:** The switch will process 7 high priority packets first, then 1 low priority packet.

- Press the **Esc** key to return to the next-highest menu.
- Select <**Apply**> to apply the configuration.

```
funkwerk S1224p : Priority Configuration
=====
Level 0 : Low
Level 1 : Low
Level 2 : Low
Level 3 : Low
Level 4 : High
Level 5 : High
Level 6 : High
Level 7 : High

QoS Mode : All High Before Low

Actions->  <Edit>  <Apply>  <Quit>
[Select] Select the action menu.
[TAB/BKSPC] Move Item  [Enter] Select Item  [Esc] Previous Menu
```

Figure 4-26: Priority configuration interface

**MAC Address Configuration** Insert a static MAC address which will remain in the address table of the switch, independent of whether or not the device is physically connected to the switch. The switch will not have to learn the MAC address of the device again if the lat-

ter is operated in the network once more after a connection breakdown or after the device was switched off.

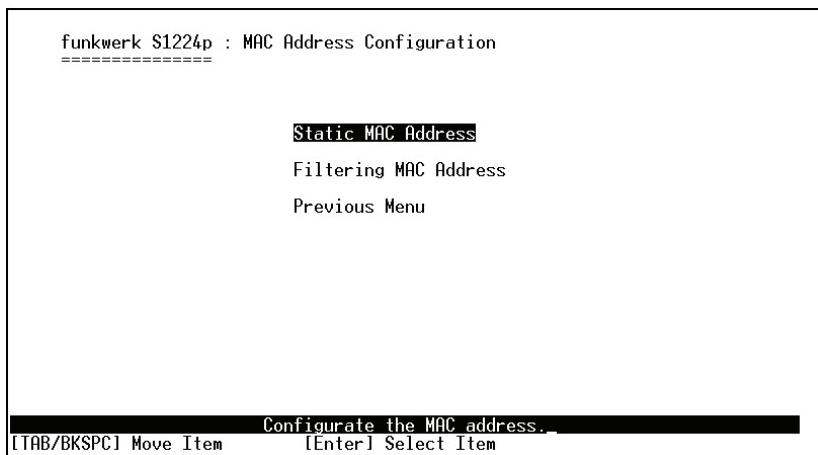


Figure 4-27: MAC address configuration interface

### Static MAC Address

#### Adding a Static MAC Address

Allows you to add a static MAC address to the address table of the switch.

- Select <Add> -> <Edit> to add the static MAC address.
- **MAC ADDRESS:** Enter the MAC address of the port which forwards the data traffic permanently, independent of the device activity in the network.
- **PORT No.:** Press the **space key** to select the port number.
- **VLAN ID:** Enter the VLAN ID.
- Press the **Esc** key to return to the next-highest menu.

- Select <**Apply**> to apply the configuration.

```
funkwerk S1224p : Add Static MAC Address
=====
MAC Address :
Port No. :
VLAN ID :

Actions-> <Edit> <Apply> <Quit>
[Select the action menu.] [TAB/BKSPC] Move Item [Enter] Select Item [Esc] Previous Menu
```

Figure 4-28: Adding static MAC addresses interface

#### Editing the Static MAC Address

- Select <**Edit**>.
- Select the MAC address you want to edit.
- Press the **Enter** key.
- Select <**Edit**> to perform the modification.
- Press the **Esc** key to return to the next-highest menu.
- Select <**Apply**> to apply the configuration.

#### Deleting the Static MAC Address

- Select <**Delete**>.
- Select the MAC address you want to delete.
- Press the **Enter** key to delete the address.

## Filtering MAC Address

Allows you to add, delete, and edit filtering MAC addresses.

### Adding a Filtering MAC Address

- Select <Add> -> <Edit> to add a MAC address to the filter.
- **MAC ADDRESS:** Enter the MAC address you wish to filter.
- Press the **Esc** key to return to the next-highest menu.
- Select <Apply> to apply the configuration.

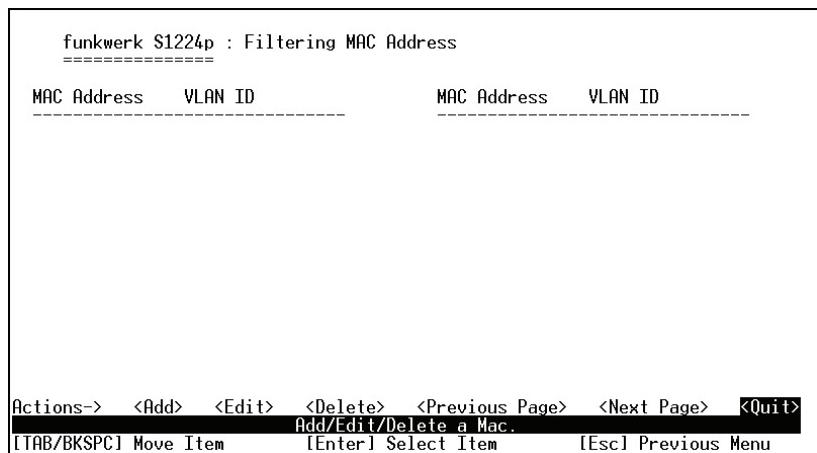


Figure 4-29: Adding filtering MAC addresses interface

### Editing a Filtering MAC Address

- Select <Edit> to change a filter address.
- Select the MAC address you want to edit.
- Press the **Enter** key.
- Select <Edit> to perform the modification.
- Press the **Esc** key to return to the next-highest menu.

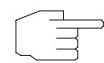
- Select <**Apply**> to apply the configuration.

#### Deleting a Filtering MAC Address

- Select <**Delete**> to delete a filter MAC address.
- Select the MAC address you want to delete.
- Press the **Enter** key.

**Misc Configuration** Allows you to configure the switch parameters.

- **MAC ADDRESS AGEING TIME:** Update interval of the MAC address table. Enter a duration in seconds a non-active MAC address is to remain in the address table of the switch. Valid parameters are 0, 300-765 seconds. The default is 300 seconds.
- **BROADCAST STORM FILTER MODE:** Allows you to configure the filter mode for the broadcast storm. Valid threshold values are 5 %, 10 %, 15 %, 20 %, 25 %, and N/A. The port will be blocked when the configured percentage is exceeded.
- **MAX BRIDGE TRANSMIT DELAY BOUND:** Allows you to limit the delay of packets in the switch. If the delay time of a packet is exceeded, it will be discarded. Press the space key to enter the delay time. Valid parameters are 1 sec, 2 sec, 4 sec, and off (the default is off).
- **LOW QUEUE DELAY BOUND:** Allows you to limit the delay of low-priority packets in the switch. If a low-priority packet remains in the switch longer than the Low Queue Max Delay Time parameter specifies, it will be transmitted. Use the **space key** to enable or disable this function.
- **LOW QUEUE MAX DELAY TIME:** Allows you to set the delay of low-priority packets in the switch. Valid parameters are 1-255 ms (the Max Delay Time default is 255 ms).

**Note**

To be able to use the "Max Bridge Transit Delay Bound" option, the "Low Queue Delay Bound" option must be enabled.

**Note****■ COLLISIONS RETRY FOREVER:**

- **DISABLE (IN HALF-DUPLEX MODE):** If collisions occur, the system will retry to send the frame 48 times before discarding it.
- **ENABLE (IN HALF-DUPLEX MODE):** If collisions occur, the system will retry to send the frame infinite times.

**■ HASH ALGORITHM:** This hash algorithm serves to manage the entries in the MAC address table through arithmetic techniques.**■ IFG COMPENSATION:** Lets you enable or disable the internal packet gap time compensation.

```
funkwerk S1224P : Misc Configuration
=====
MAC Address Ageing Time (0, 300..765) : 300
Broadcast Storm Filter Mode : 5%
Max Bridge Transmit Delay Bound : OFF
Low Queue Delay Bound : Disable
Low Queue Max Delay Time (1..255) : 255
Collisions Retry Forever : Enable
Hash Algorithm : CRC Hash
IFG Compensation : Enable

Actions-> <Edit> <Apply> <Quit>
[TAB/BKSPC] Move Item [Enter] Select Item [Esc] Previous Menu
```

Figure 4-30: Misc Configuration menu interface

### 4.5.3 Protocol Related Configuration

The Protocol Related Configuration menu allows you to configure the Rapid Spanning Tree, SNMP, LACP, IGMP/GVRP, and 802.1x protocols.

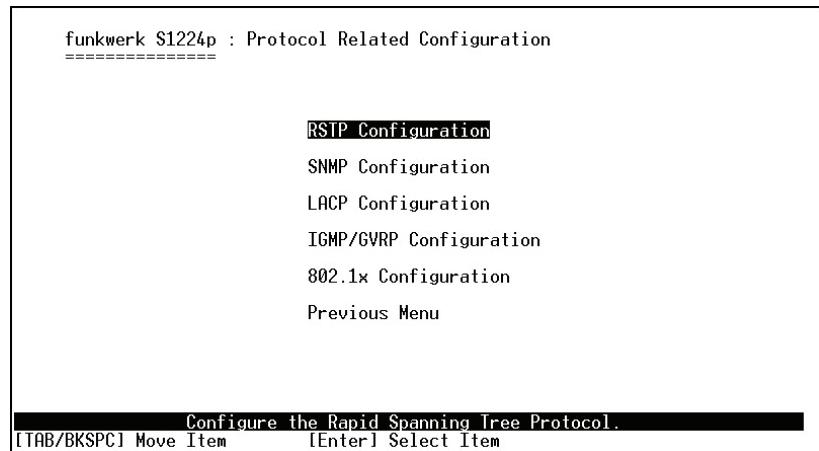


Figure 4-31: Protocol Related Configuration interface

**RSTP Configuration** Rapid Spanning Tree is a link management protocol, which offers path redundancy and at the same time prevents undesirable loops in the network.

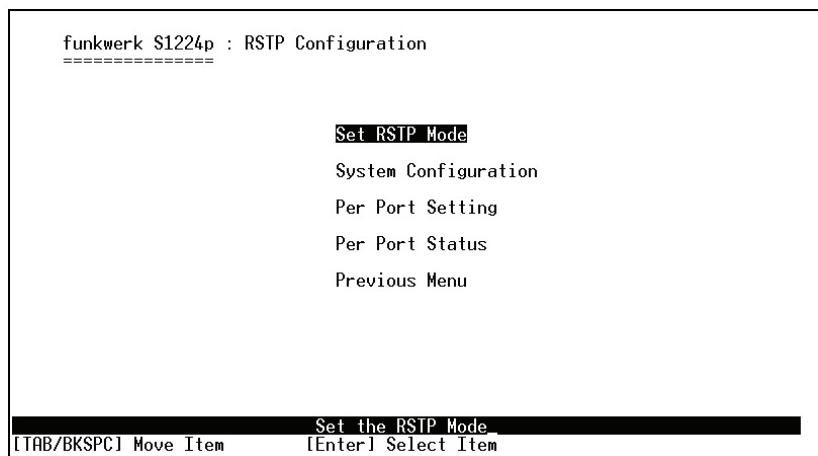


Figure 4-32: RSTP configuration interface

### RSTP Setup

Enabling the Rapid Spanning Tree Functionality

- Select <Edit>.
- Press the **space key** to select the option.

- Select <Apply> to apply the configuration.

```
funkwerk S1224p : RSTP Setup
=====
RSTP : Disable

Actions-> <Edit> <Apply> <Quit>
Select the action menu.
[TAB/BKSPC] Move Item [Enter] Select Item [Esc] Previous Menu
```

Figure 4-33: RSTP setup interface

## System Configuration

Allows you to configure the RSTP system parameters. In addition, root bridge information on Rapid Spanning Tree will be displayed here.

- Select <Edit>.
- **PRIORITY (0-65535)**: The bridge with the lowest parameter has the highest priority and will be selected as the root when the parameter is changed. The system must be restarted to specify the priority value of paths. According to the standard protocol, the value must be a multiple of 4096.
- **MAX AGE (6-40)**: Duration in seconds (6 to 40) that protocol information received on a port is stored by the switch.
- **HELLO TIME (1-10)**: Allows you to define a time slot from 1 to 10 s during which the switch transmits hello broadcasts to other switches.
- **FORWARD DELAY TIME (4-30)**: Duration in seconds of the listening and learning states before the port starts the forwarding.

- Select <Apply> to apply the configuration.

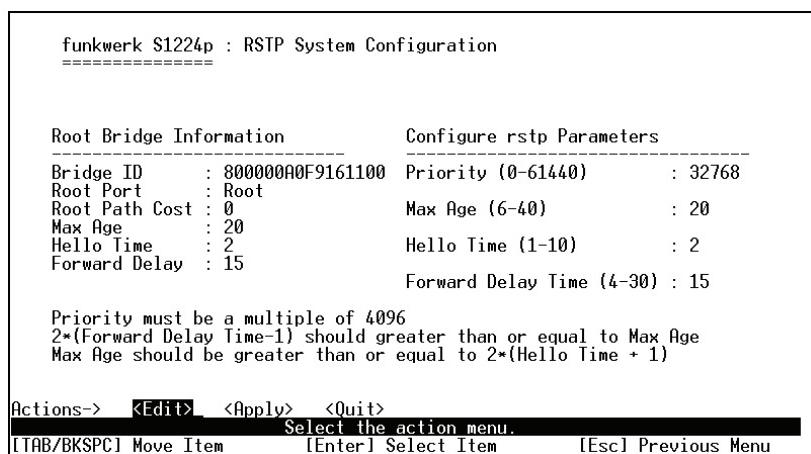


Figure 4-34: RSTP system configuration interface

### Per Port Setting

- Select <Edit>.
- **PATH COST:** Specifies the path costs of the port, which the switch uses to determine which ports are forwarding ports.
- **PRIORITY:** Refers to the port priority. Allows you to define how probable it is for this port to become the root port.
- Press the **Esc** key to return to the next-highest menu.
- Select <Apply> to apply the configuration.

- Select <Next Page> to configure the remaining ports, and then <Previous Page> to return to the previous page.

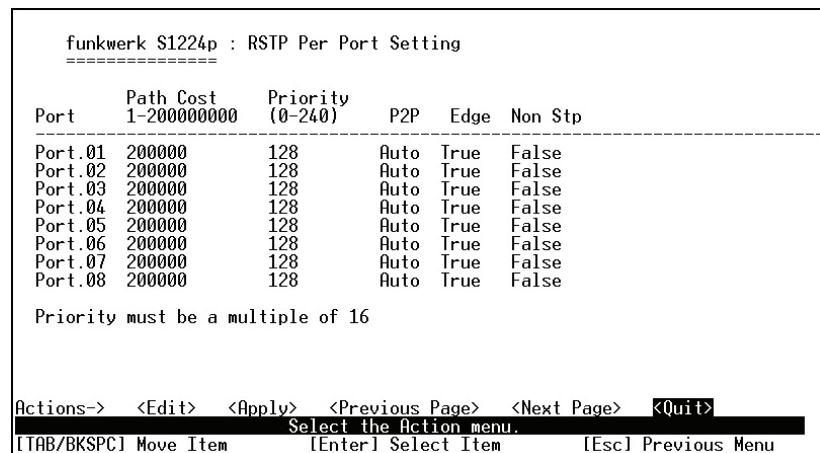


Figure 4-35: Port-specific settings interface

**SNMP** Allows you to define management stations as trap managers and SNMP community strings.

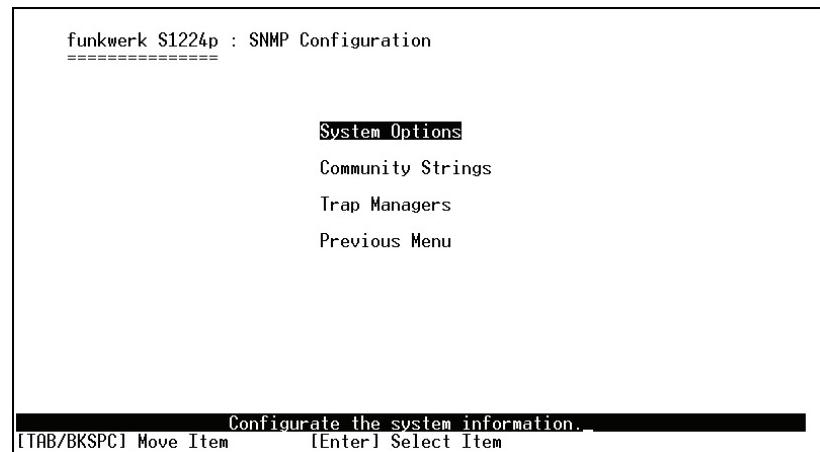


Figure 4-36: SNMP configuration interface

- SNMP System Options**
- Select <Edit>.
  - **NAME:** Assign a name to the switch.
  - **CONTACT:** Enter the name of a contact person or organization.
  - **LOCATION:** Enter the switch location.
  - Press the **Esc** key to return to the next-highest menu.
  - Select <Apply> to apply the configuration.

```
funkwerk S1224P : SNMP System Options
=====
Name      :
Contact   :
Location  :

Actions->  <Edit>  <Apply>  <Quit>
[TAB/BKSPC] Move Item  [Enter] Select Item  [Esc] Previous Menu
Select the action menu.
```

Figure 4-37: SNMP system options interface

## Community Strings

### Adding Community Strings

- Select <Add> -> <Edit>.
- **COMMUNITY NAME:** Enter the name of the community string.
- **WRITE ACCESS:** Allows you to define read-only or read and write access rights.
  - **READ ONLY:** Enables requests with this string to display information on MIB objects (read-only access).

- **READ/WRITE:** Enables requests with this string to display information on MIB objects and to create MIB objects (read and write access rights).

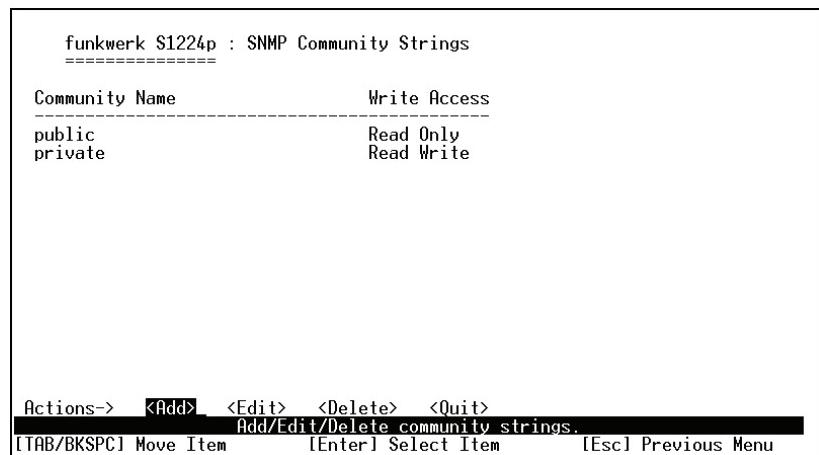


Figure 4-38: Adding community strings interface

### Editing SNMP Communities

- Select **<Edit>**.
- Press the **Enter** key.
- **COMMUNITY NAME:** Enter the new name.
- **WRITE ACCESS:** Press the space key to modify the access rights.
- Select **<Apply>** to apply the configuration.

### Deleting SNMP Community Strings

- Select **<Delete>**.
- Select the community string you wish to delete.
- Press the **Enter** key to delete the address.

### Trap Managers

A trap manager is a management station which receives traps. Traps are system alerts created by the switch. If no trap manager has been defined, no traps will be created.

#### Adding a Trap Manager

- Select <Add> -> <Edit>.
- **IP:** Enter the IP address of the station which is to be the trap manager station.
- **COMMUNITY NAME:** Enter the community name.
- Press the **Esc** key to return to the next-highest menu.
- Select <Apply> to apply the configuration.

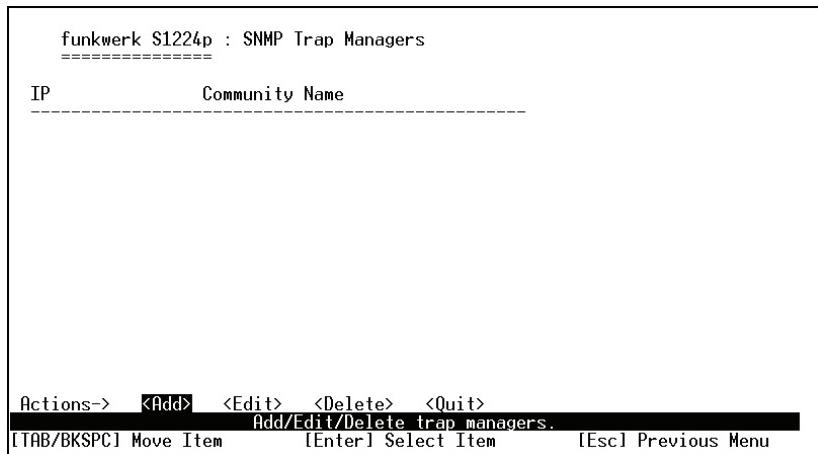


Figure 4-39: Adding trap manager interface

#### Deleting a Trap Manager

- Select <Delete>.
- Select the trap manager you wish to delete.
- Press the **Enter** key to delete the address.

**LACP** The Link Aggregation Control Protocol (LACP) permits the standardized information exchange between partner systems on a trunk. In the process, it enables the link aggregation control instances of both systems to negotiate the identity of the aggregation group to which the link belongs, to assign the link to this link aggregation group and to ensure that the transfer and receipt of data on this link works without fault. 4 consecutively arranged ports can be combined to a single dedicated connection by means of trunk groups. This feature serves to extend the bandwidth provided for a device in the network. **LACP requires the full-duplex mode.** For further details, see Standard IEEE 802.3ad.

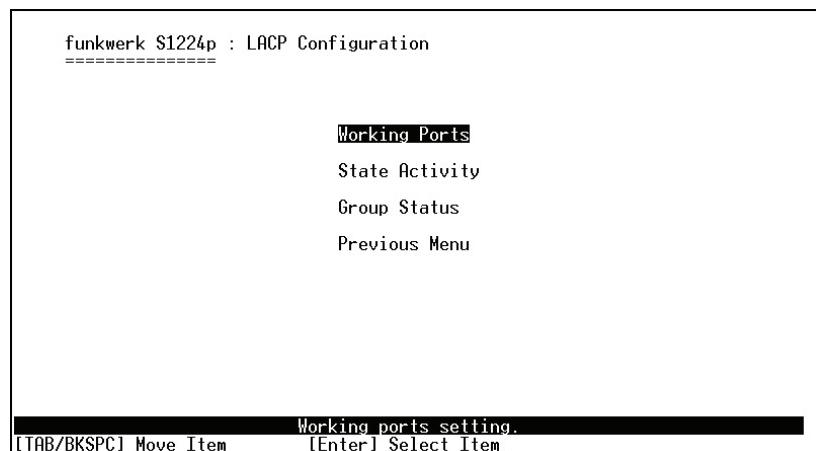
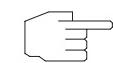


Figure 4-40: LACP configuration interface

### Working Ports

- Select <Edit>.
- **GROUP:** Displays information on the trunk group ID.
- **WORKING PORT NUM:** Maximum number of ports that can be aggregated simultaneously. If a static LACP trunk group is configured, all excess ports are set to the stand-by mode and are added to the group if a work port breaks down. In the case of local static trunk groups, the number of ports has to match the number of member ports.
- Select <Apply> to apply the configuration.

**Note**

Configure the trunk groups before configuring the LACP functionality.

```
funkwerk S1224P : LACP Working Ports
=====
Group      Work Ports
-----
Actions->  <Edit>  <Apply>  <Quit>
Select the action menu.
[TAB/BKSPC] Move Item  [Enter] Select Item  [Esc] Previous Menu
```

Figure 4-41: LACP working ports configuration interface

### LACP State Activity

- Select <**Edit**>.
- Press the **space key** to select the activity status of the port.
  - **ACTIVE**: The port transfers LACP protocol packets automatically.
  - **PASSIVE**: The port does not transfer LACP protocol packets automatically. The port replies only if it receives an LACP protocol packet from a device at the opposite end.

- Select <Apply> to apply the configuration.

```
funkwerk S1224p : LACP State Activity
=====
Port          State Activity          Port          State Activity
-----
Actions->  <Edit>  <Apply>  <Quit>
Select the action menu.
[TAB/BKSPC] Move Item  [Enter] Select Item  [Esc] Previous Menu
```

Figure 4-42: LACP activity status configuration interface

### LACP Group Status

If you have set up trunk groups, the information below will be displayed.

- |   |  |
|---|--|
| <b>IGMP/GVRP Configuration</b>                        | Enables or disables IGMP/GVRP (GARP VLAN Registration Protocol). |
| ■ Select <Edit>.                                      |  |
| ■ Press the <b>space key</b> to modify the parameter. |  |

- Select <Apply> to apply the configuration.

```
funkwerk S1224p : IGMP/GVRP Configuration
=====
IGMP      : Disable
Query Mode : Disable
GVRP      : Disable

Actions-> <Edit> <Apply> <Quit>
[TAB/BKSPC] Move Item [Enter] Select Item [Esc] Previous Menu
```

Figure 4-43: IGMP / GVRP configuration interface

#### 802.1x Configuration

Configuring the 802.1x settings.

```
funkwerk S1224p : 802.1x Configuration
=====
802.1x Setup
System Configuration
Per Port Setting
Misc Configuration
Previous Menu

Enable or disable 802.1x Protocol function.
[TAB/BKSPC] Move Item [Enter] Select Item
```

Figure 4-44: 802.1x configuration interface

## 802.1x Setup

Enables or disables the 802.1x protocol.

- Select <Edit>.
- Use the **space key** to enable or disable the 802.1x protocol.
- Select <Apply> to apply the configuration.

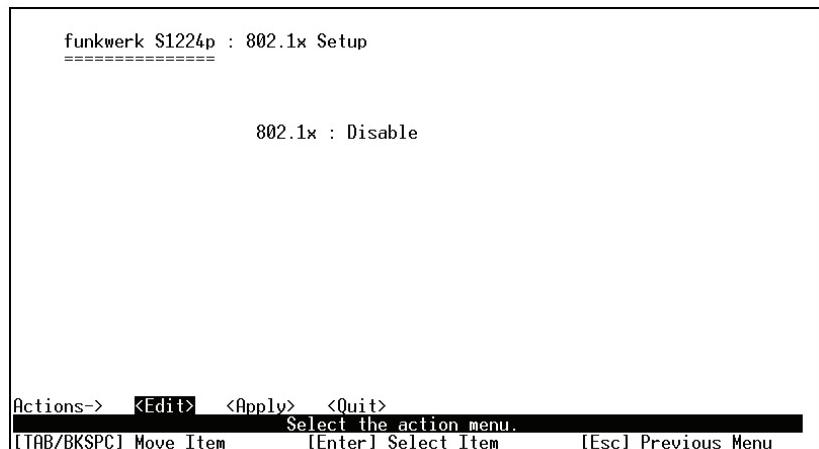


Figure 4-45: 802.1x setup interface

## System Configuration

Allows you to configure the 802.1x parameters.

- Select <Edit>.
- **RADIUS SERVER IP:** Determines the IP address of the Radius server.
- **SHARED KEY:** Defines an encryption key to be used for authentication requests to the specified Radius server. This key must match the encryption key on the Radius server.
- **NAS, IDENTIFIER:** Defines the ID for the Radius client.
- **SERVER PORT:** Defines the UDP destination port to be used for authentication requests to the specified Radius server.

- **ACCOUNTING PORT:** Defines the UDP destination port to be used for billing requests to the specified Radius server.
- Select <Apply> to apply the configuration.

```
funkwerk S1224P : 802.1x System Configuration
=====
Radius Server IP : 192.168.0.3
Shared Key       : 12345678
NAS, Identifier  : NAS_L2_SWITCH
Server Port      : 1812
Accounting Port  : 1813

Actions->  <Edit>  <Apply>  <Quit>
Select the action menu.
[TAB/BKSPC] Move Item  [Enter] Select Item  [Esc] Previous Menu
```

Figure 4-46: 802.1x system configuration interface

### Per Port Setting

Possible status parameters are Disable, Accept, Reject, and Authorize.

- Press the **space key** to modify the status parameter.
- **REJECT:** The specified port has to remain in an unauthorized state.
- **ACCEPT:** The specified port has to remain in an authorized state.
- **AUTHORIZED:** The specified port is either set to "authorized" or "unauthorized". The state depends on the result of the authentication process which is performed between the supplicant and the authentication server.

- **DISABLE:** The specified port has to remain in an authorized state.

```
funkwerk S1224P : 802.1x Per Port Setting
=====
Port          State
-----
Port.01        Disable
Port.02        Disable
Port.03        Disable
Port.04        Disable
Port.05        Disable
Port.06        Disable
Port.07        Disable
Port.08        Disable

Actions->  <Edit>  <Apply>  <Previous Page>  <Next Page>  <Quit>
                                         Select the Action menu.
[TAB/BKSPC] Move Item      [Enter] Select Item      [Esc] Previous Menu
```

Figure 4-47: 802.1x configuration per port interface

### Misc Configuration

- Select **<Edit>**.
- **QUIET PERIOD:** Defines the time period during which the port does not accept queries from supplicants.
- **TX PERIOD:** Determines the time period during which the port waits to send the next EAPOL PDU during an authentication.
- **SUPPLICANT TIMEOUT:** Determines the period of time the switch waits for a supplicant to reply to an EAP request.
- **SERVER TIMEOUT:** Determines the period of time the switch waits for the server to reply to an authentication request.
- **REAUTHORIZE MAXIMUM:** Defines the number of authentication attempts after which the authentication will be regarded as failed and the authentication session will be terminated.
- **REAUTHORIZE PERIOD:** Determines the period of time after which the connected clients have to be re-authenticated.

- Select <Apply> to apply the configuration.

```
funkwerk S1224p : 802.1x Misc Configuration
=====
Quiet Period (0..65535, Default=60)      : 60
Tx Period (0..65535, Default=30)        : 30
Supplicant Timeout (1..300, Default=30)   : 30
Server Timeout (1..300, Default=30)       : 30
Reauthorize Maximum (1..10, Default=2)     : 2
Reauth Period (1..9999999, Default=3600)  : 3600

Actions->  <Edit>  <Apply>  <Quit>
Select the action menu.
[TAB/BKSPC] Move Item  [Enter] Select Item  [Esc] Previous Menu
```

Figure 4-48: Miscellaneous configurations according to 802.1x interface

#### 4.5.4 System Reset Configuration

```
funkwerk S1224p : System Reset Configuration
=====

Factory Default
System Reboot
TFTP Configuration
Previous Menu

Restore to factory default setting.
[TAB/BKSPC] Move Item  [Enter] Select Item
```

Figure 4-49: System reset configuration interface

- Factory Default** Reset button to reset the system to the default settings.
- Enter **Y** if you want the switch to reload the default settings.
  - After resetting the default settings, the switch automatically performs a reboot.

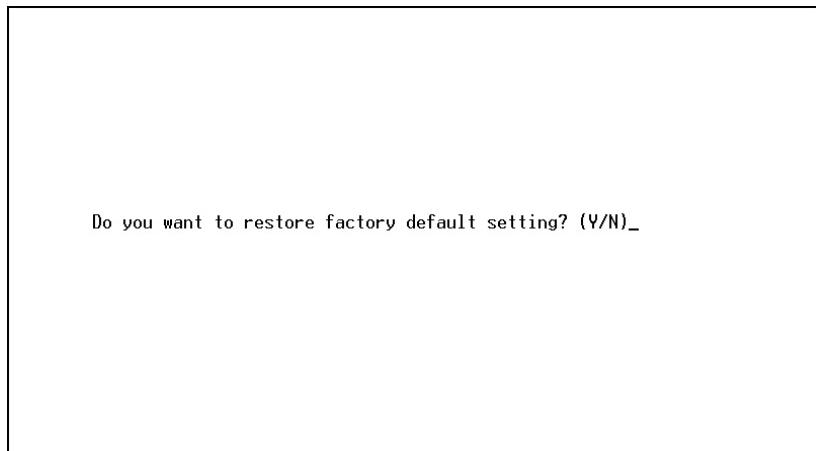


Figure 4-50: Default settings interface

- System Reboot** Restart the switch via a software reset. All configurations remain the way you have defined them.

**TFTP Configuration** This menu item allows you to define the TFTP configuration.

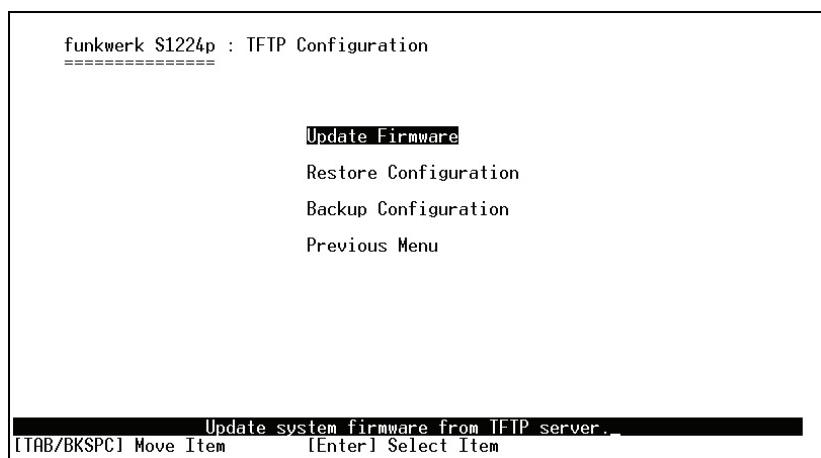


Figure 4-51: TFTP configuration menu

#### **TFTP Update Firmware**

Allows you to update the switch firmware.

- **TFTP SERVER IP ADDRESS:** Enter the IP address of the TFTP server.
- **FIRMWARE FILE NAME:** Name of the firmware configuration file.

- Click the **Apply** button.

```
funkwerk S1224p : TFTP Update Firmware
=====
TFTP Server IP      : 0.0.0.0
Firmware File Name : image.bin

Actions-> <Edit> <Apply> <Quit>
Select the action menu.
[TAB/BKSPC] Move Item      [Enter] Select Item      [Esc] Previous Menu
```

Figure 4-52: Update TFTP firmware interface

### TFTP Restore Configuration

This menu item allows you to restore the EEPROM parameter from the TFTP server.

- **TFTP SERVER IP ADDRESS:** Enter the IP address of the TFTP server.
- **RESTORE FILE NAME:** Enter the name of the configuration file you wish to restore.

- Click the **Apply** button.

```
funkwerk S1224p : TFTP Restore Configuration
=====
TFTP Server IP      : 0.0.0.0
Restore File Name : data.dat

Actions-> <Edit> <Apply> <Quit>
Select the action menu.
[TAB/BKSPC] Move Item [Enter] Select Item [Esc] Previous Menu
```

Figure 4-53: Restore configuration from TFTP interface

### TFTP Backup Configuration

Saves the current EEPROM parameter of the switch to the TFTP server.

- **TFTP SERVER IP ADDRESS:** Enter the IP address of the TFTP server.
- **BACKUP FILE NAME:** Enter the name of the configuration file.

- Click the **Apply** button.

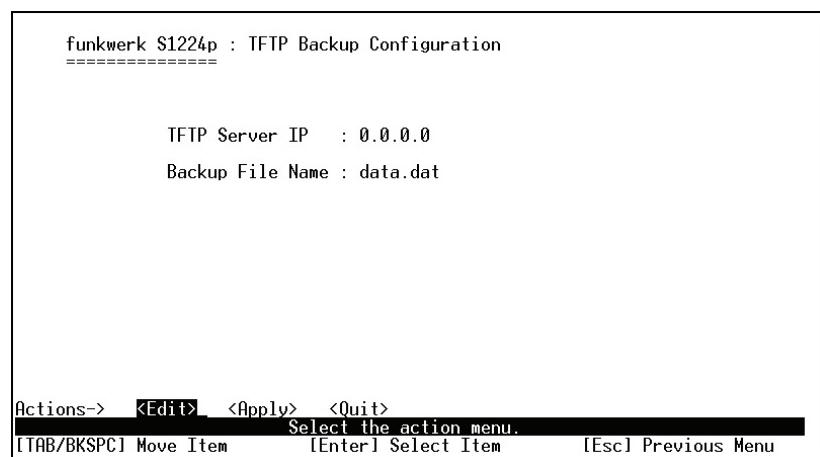


Figure 4-54: TFTP backup configuration interface

#### 4.5.5 Power Menu

Allows you to display information on and configure the Uninterruptible Power Supply (UPS).

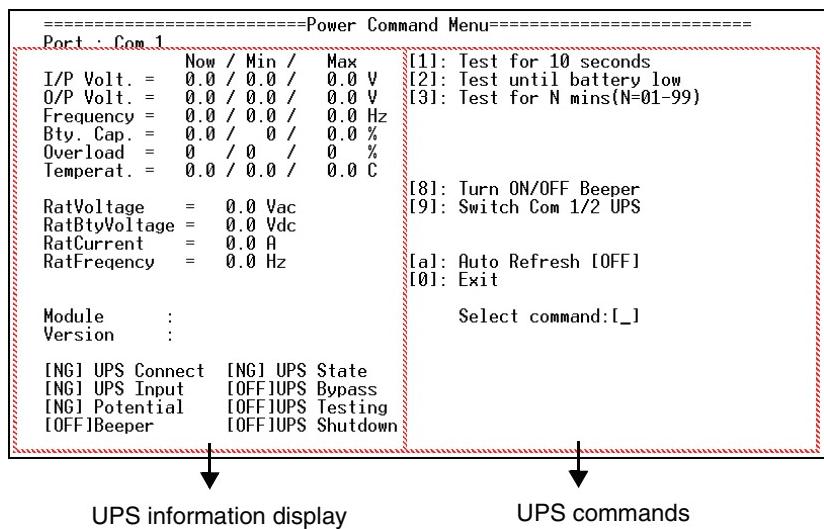


Figure 4-55: Displaying UPS information

- **I/P VOLT.:** Displays the current value as well as minimum and maximum UPS input voltage.
- **O/P VOLT.:** Displays the current value as well as minimum and maximum UPS output voltage.
- **FREQUENCY:** Displays the UPS frequency parameter.
- **BTY. CAP.:** Displays the UPS battery capacity.
- **OVERLOAD:** Displays the UPS overload capacity.
- **TEMPERAT.:** Displays the current UPS temperature.
- **SELECT COMMAND:** Enter the command number into the field, and press Enter.

### UPS Commands

Command	Description
[1] Test for 10 seconds	A self-test of the uninterruptible power supply is carried out, which lasts 10 seconds.
[8] Turn ON/OFF Beeper	Lets you turn the UPS beeper on and off.
[9] Switch Com 1/2 UPS	Switches to UPS on com1 or com2.
[a] Auto Refresh	Enables the automatic screen refresh.
[0] Exit	Exits the UPS menu mode.

### 4.5.6 POE Menu

Allows you to display POE information and lets you configure the POE port.

- **PORT ENABLE:** Displays the POE port status. **Y** means that the port is enabled. **N** means that the port is disabled, and there is no power supply. The port can still transmit the data packet, however.
- **PWRLIMITCLASS.:** Displays **Y** if the classification function for the maximum output power delivered to a PD is enabled, and **N** if it is disabled. If you enable this function, the maximum power output parameter will be controlled by the **PowerLimitMax** parameter.
- **PWRLIMITMANAG.:** Shows the POE management, which may be based on the *priority rules*.

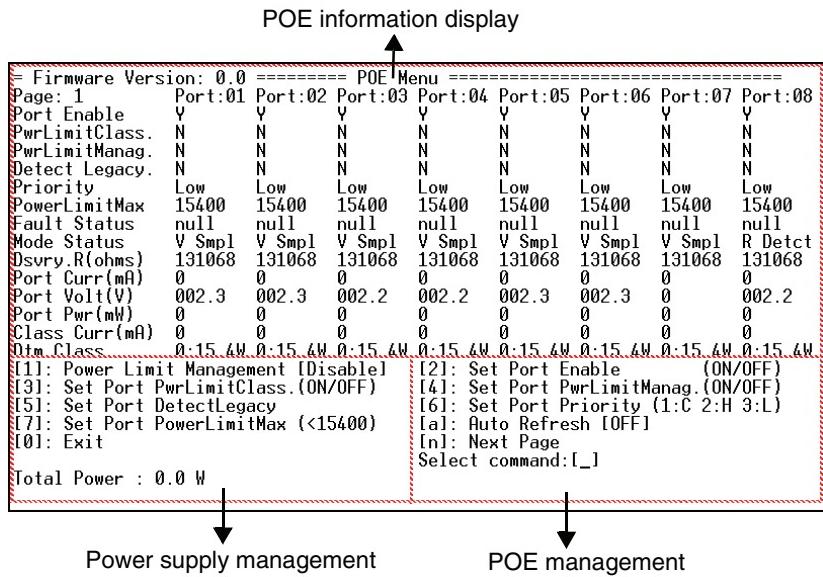


Figure 4-56: Displaying POE information

- **Detect Legacy:** Enable this function to be able to supply power to so-called legacy PDs (which do not support Standard IEEE 802.3af).
- **Priority:** Port priority for the power supply priority. 1 = C (critical), 2 = H (high), 3 = L (low)
- **PowerLimitMax:** Maximum output power parameter per port.
- **Fault Status:** Displays the PD error status messages. There are the following three error status messages:
  - Null: There is no PD connected, or the status of the connected PD is normal.
  - Overload: The current is above the maximum defined for the PD (475mA @ 48V DC) for more than 50 msec.
- **Mode Status:** Displays the current mode status of the PD.
  - **V SAMPLE OR I SAMPLE:** Voltage or intensity of current sample. When the POE switch detects a PD and supplies power to it, it will then monitor

the voltage or intensity of current on this port to find out whether or not the PD is still active. This procedure corresponds to IEEE 802.3af.

- **R DETECT:** If there is no PD connected to the port, the POE switch polls every port and detects the resistance.

- **Dsvry R (OHMS):** Displays the resistance.
- **PORT CURR (MA):** Displays the current.
- **PORT VOLT (V):** Displays the voltage.
- **PORT PWR (W):** Displays the power in Watt.
- **CLASS CURR(MA):** Shows the current in mA for the class.
- **FIRMWARE VERSION:** Indicates the firmware version of the system.
- **TOTAL PORT POWER (W):** Displays the total power provided to PDs.
- **POWER MANAGEMENT:** Status of the power management function.
- **TOTAL POWER LIMIT:** Maximum total power all ports can provide.

#### Commands

- **SELECT COMMAND:** Enter the number of the POE command or power supply management command into the field, and press Enter. The power supply management command appears if *Port PwrLimit Mangag.* is enabled.

Command	Description
[1] Power Management (Enable)	Lets you enable or disable the POE power management function.
[2] Set Port Enable (ON/OFF)	Lets you enable or disable the POE inject function.
[3]. Set Port PwrLimitClass. (ON/OFF)	Lets you enable or disable an output power limit. If this function is enabled, the Power Limit Max per port parameter will be taken into account.
[4] Set Port PwrLimitManag. (ON/OFF)	Lets you enable or disable the port power limit management for the power supply management.
[5] Set Port DetectLegacy	Enables the Legacy Detection function on the port.
[6] Set Port Priority (1:C 2:H 3:L)	Sets the port priority for power supply management.
[7] Set Power Limit Max (<15400)	Allows you to set the maximum power output for each port. The maximum must be below 15400.
[a] Auto Refresh [OFF]	Lets you enable or disable the automatic refresh parameter.
[t] Set Total Power Limit	Allows you to set the total output power limit. This option will be displayed if power management is enabled.
[n] Next Page	Jumps to the next page.
[0] Exit	Exits the POE menu mode.

#### 4.5.7 Save Configuration

Saves the configuration to the flash memory when the configuration has been changed. Otherwise, the new configuration will be lost if the switch is restarted or taken off the power supply.

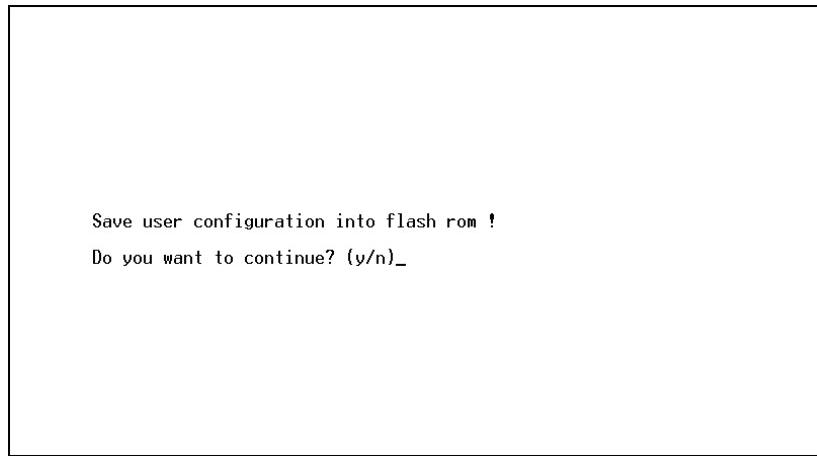


Figure 4-57: Save configuration interface

#### 4.5.8 Xmodem Upgrade

Before using the Xmodem Upgrade function, unplug the terminal and set the baud rate to 57,600 bps. Then reconnect the terminal.

1. Enter **X** to start the Xmodem upgrade.
2. The following messages will be displayed:

```
$$$ Switch LOADER Checksum 0.K !!!] Select Item  
$$$ Press X key to start Xmodem receiver:  
$$$ Loading Xmodem Driver....  
$$$ Download IMAGE through console(1K Xmodem;baudrate=57600bps)  
$$$ Start Xmodem Receiver: -
```

Figure 4-58: Xmodem Upgrade interface

3. From the **Transfer** menu, select **send file**.
4. Click the **browse** button to select the path.

5. Select **1K Xmodem** as protocol, and click the **Send** button.
6. When you have successfully upgraded the firmware, reset the baud rate to 9,600 bps.



## 5 Web-Based Management

This section introduces you to the configuration and the functions of Web-based management.

### 5.1 Web-Based Management

The CPU circuit board of the switch comes with an integrated HTML Web site stored in the flash memory. It offers extended management features and allows the user to manage the switch from any location in the network by means of a standard browser, e. g. Microsoft Internet Explorer.

Web-based management supports Internet Explorer 5.0. The application with Java Applets consumes less bandwidth, increases the access speed, and offers the user an easy-to-monitor screen.



#### Note

By default, IE 5.0 and higher does not allow Java Applets to activate sockets. To allow the Java Applets to control network ports, you have to change your browser settings.

### 5.2 Preparation for Web Management

Before launching Web Management, you can use the console to log on to the switch. Check the default IP address of the switch. Chapter [Console Management](#) provides information on how to log in using the console. If you have to change the IP address when logging in for the first time, please use the console to do this. The default settings are as follows:

<b>IP ADDRESS:</b>	192.168.0.248
<b>SUBNET MASK:</b>	255.255.255.0
<b>DEFAULT GATEWAY:</b>	0.0.0.0
<b>USER NAME:</b>	admin
<b>PASSWORD:</b>	funkwerk

### 5.3 Online Help

Click **Help** if you have any questions during the configuration.

### 5.4 System Log-on

1. Start the Internet Explorer.
2. Enter "http://" + the IP address of the **funkwerk S1224p FastEthernet PoE Switch**.
3. Press the **Enter** key.
4. The login screen appears.
5. Enter the user name and the password (by default, admin and funkwerk).

- Click the **Enter** or **OK** button. The home page of the Web-based management application is displayed.

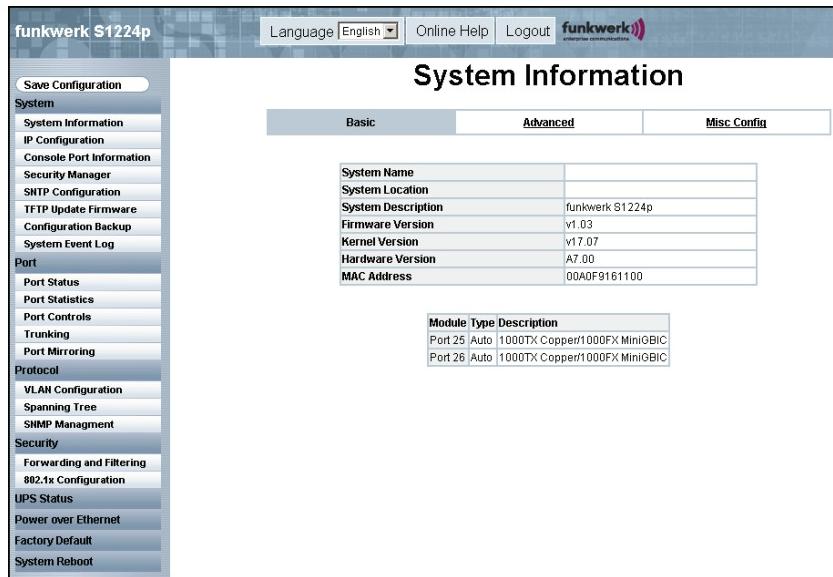


Figure 5-1: Web management interface of the **funkwerk S1224p FastEthernet PoE Switch**

## 5.5 Save Configuration

Saves the configuration to the flash memory when the configuration has been changed. Otherwise, the new configuration will be lost if the switch is restarted or taken off the power supply.

- Click the **Save Configuration** button to save the configuration in the flash memory.

**Save Configuration**

Save Configuration

Figure 5-2: Save configuration interface

## 5.6 System

This menu item offers the following items: **System Information**, **IP Configuration**, **Console Port Information**, **Security Manager**, **SNTP Configuration**, **TFTP Update Firmware**, **Configuration Backup**, and **System Event Log**.

### 5.6.1 System Information

**Basic** Displays general information referring to the switch.

- **SYSTEM NAME:** Name of the switch
- **SYSTEM LOCATION:** Physical location of the switch
- **SYSTEM DESCRIPTION:** Description of the switch
- **FIRMWARE VERSION:** Indicates the firmware version of the switch.
- **KERNEL VERSION:** Indicates the kernel software version.
- **HARDWARE VERSION:** Indicates the hardware version of the switch.
- **MAC ADDRESS:** Indicates the unambiguous hardware address, which is assigned by default by the manufacturer.

- **MODULE:** Displays module information. If the module is not installed on the switch, no information is shown.

System Information		
Basic	Advanced	Misc Config
System Name		
System Location		
System Description	funkwerk S1224p	
Firmware Version	v1.03	
Kernel Version	v17.07	
Hardware Version	A7.00	
MAC Address	00A0F9161100	
Module Type Description		
Port 25	Auto	1000TX Copper/1000FX MiniGBIC
Port 26	Auto	1000TX Copper/1000FX MiniGBIC

Figure 5-3: General switch settings interface

**Advanced** Refers to entries in the MAC address table.

- **AGE-OUT TIME:** Enter a duration in seconds a non-active MAC address is to remain in the address table of the switch. Valid parameters are 300-765 seconds. The default is 300 seconds.
- **MAX BRIDGE TRANSMIT DELAY BOUND CONTROL:** Allows you to limit the delay of packets in the switch. If the delay time of a packet is exceeded, it will be discarded. Valid parameters are 1 sec, 2 sec, 4 sec, and off.
- **ENABLE LOW QUEUE DELAY BOUND:** Allows you to limit the delay of low-priority packets in the switch. If a low-priority packet remains in the switch longer than the Max Delay Time parameter specifies, it will be transmitted. Valid parameters are 1-255 ms.



To be able to use the "Max Bridge Transit Delay Bound" option, the "Low Queue Delay Bound" option must be enabled.

**Note**

- **BROADCAST STORM FILTER MODE:** Allows you to configure the broadcast storm control. Enable this option, and define the upper limit for the individ-

ual ports. The upper limit corresponds to the percentage of the entire port bandwidth that is available for broadcast traffic. If the broadcast traffic on a port exceeds the defined limit, the broadcast storm control becomes active. Valid threshold values are 5 %, 10 %, 15 %, 20 %, 25 %, and off.

- Select **Apply** to finish the configuration.

The screenshot shows the 'System Information' configuration page. At the top, there are three tabs: 'Basic' (selected), 'Advanced', and 'Misc Config'. The 'Advanced' tab contains several configuration options:

- Enable MAC Address Aging Out:** Checked. **Age-Out Time:** 300 seconds (300..765, must multiple of 3).
- Max Bridge Transmit Delay Bound:** OFF (dropdown menu).
- Enable Low Queue Delay Bound:** Unchecked. **Max Delay Time:** 255 (1..255, 2ms/unit).
- Broadcast Storm Filter Mode:** 5% (dropdown menu).

Below these are sections for 'Priority Queue Service' and '802.1p Priority'.

**Priority Queue Service:**

- First Come First Service:** Unchecked.
- All High Before Low:** Checked.
- Weight Round Ratio:** 2:1 (dropdown menu).

**Qos Policy (Checked for High Priority):**

- Level0
- Level1
- Level2
- Level3
- Level4
- Level5
- Level6
- Level7

At the bottom right are 'Apply' and 'Default' buttons.

Figure 5-4: Advanced switch settings interface

**PRIORITY QUEUE SERVICE:** Select the service type regarding the queue priority.

- **FIRST COME FIRST SERVICE:** The packets will be transmitted in the order in which they are received.
- **ALL HIGH BEFORE LOW:** High-priority packets will be transmitted before low-priority packets.
- **WEIGHTED ROUND RATIO:** Define the degree of preferential treatment packets from the high-priority queue are to receive. Define the number of high-priority packets that are to be transmitted before one low-priority packet will be sent. Example: 5 High : Low means that the switch will transmit 5 high-priority packets before sending 1 low-priority packet.

- **QoS Policy (CHECKED FOR HIGH PRIORITY):** The priority levels 0-7 are available for you to assign to the queues with high or low priority.

### Misc Configuration

- **COLLISIONS RETRY FOREVER:**
  - **DISABLE (IN HALF-DUPLEX MODE):** If collisions occur, the system will retry to send the frame 48 times before discarding it.
  - **ENABLE (IN HALF-DUPLEX MODE):** If collisions occur, the system will retry to send the frame infinite times.
- **HASH ALGORITHM:** Select CRC Hash or Direct MAC as learning algorithm for MAC addresses.
- **IFG COMPENSATION:** Lets you enable or disable the internal packet gap time compensation.
- **802.1x PROTOCOL:** Enables or disables the 802.1x protocol.
- **IGMP QUERY MODE:** Detects various IGMP queries from clients or servers and decides which IGMP queries have the highest priority. The following modes are available:
  1. **AUTO MODE:** The device with the smallest IP address in the network sends IGMP queries.
  2. **ENABLE MODE:** Enables the transmission of IGMP queries.
  3. **DISABLE MODE:** Disables the transmission of IGMP queries.

**System Information**

Basic	Advanced	Misc Config
Collisions Retry Forever : <input checked="" type="checkbox"/> Enable Hash Algorithm : <input type="button" value="CRC Hash"/> IFG Compensation : <input checked="" type="checkbox"/> Enable 802.1x Protocol : <input checked="" type="checkbox"/> Disable IGMP Query Mode : <input checked="" type="checkbox"/> Disable		
<input type="button" value="Apply"/> <input type="button" value="Default"/>		

Figure 5-5: Various switch settings interface

## 5.6.2 IP Configuration

Serves to configure the IP address and DHCP client function.

- **DHCP CLIENT:** Select Enable to be assigned an IP address by the DHCP server. For the opposite option, select Disable. The DHCP client function works only if the switch has not been assigned a static IP address other than the default IP address. If the default IP address has been changed, DHCP is no longer effective, and the switch will go on using the static IP address assigned by the user.
- **IP ADDRESS:** Assign an IP address to the switch. The default IP address is 192.168.0.248.
- **SUBNET MASK:** Assign an IP subnet mask to the switch.
- **GATEWAY:** Assign a gateway to the switch. The default is 0.0.0.0.
- Click the **Apply** button.
- Restart the switch.



Figure 5-6: IP configuration interface

## 5.6.3 Console Port Information

The console is a standard UART interface for communication over the serial port. Use the Windows HyperTerminal application to set up the connection to the switch. Section [Log-on to the Console Interface](#) provides a description of the individual steps.

The HyperTerminal should use the following settings:

- **BAUD RATE:** 9600
- **PARITY CHECK:** none
- **DATA BITS:** 8
- **STOP BITS:** 1
- **FLOW CONTROL:** none

**Console Port Information**

Baud Rate (bps)	9600
Parity Check	none
Data Bits (bit)	8
Stop Bits (bit)	1
Flow Control	none

Figure 5-7: Console port information interface

#### 5.6.4 Security Manager

You can use this menu item to change the user name and password for the Web management log-on.

- **USER NAME:** Enter the new user name (the default name is "admin").
- **NEW PASSWORD:** Enter the new password (the default password is "funk-werk").
- **CONFIRM PASSWORD:** Retype the new password.
- Click the **Apply** button.

**Security Manager**

User Name :	admin
New Password :	*****
Confirm Password :	*****

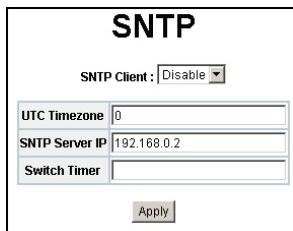
**Apply**

Figure 5-8: Security Manager interface

### 5.6.5 SNTP Configuration

This menu item serves to configure the SNTP (Simple Network Time Protocol) settings, which the switch can use to synchronize its clock over the Internet.

- **SNTP CLIENT:** Enables or disables the SNTP function which is used to query a clock synchronization from the SNTP server.
- **UTC TIMEZONE:** Determines the local time zone in which the switch is working.
- **SERVER IP:** Determines the IP address of the SNTP server.



The screenshot shows a configuration dialog titled "SNTP". It contains the following fields:

- SNTP Client: A dropdown menu set to "Disable".
- UTC Timezone: A text input field containing "0".
- SNTP Server IP: A text input field containing "192.168.0.2".
- Switch Timer: An empty text input field.

At the bottom right is an "Apply" button.

Figure 5-9: SNTP configuration interface

### 5.6.6 TFTP Update Firmware

Allows you to update the switch firmware.

- **TFTP SERVER IP ADDRESS:** Enter the IP address of the TFTP server.
- **FIRMWARE FILE NAME:** Name of the firmware configuration file.
- Click the **Apply** button.



The screenshot shows a configuration dialog titled "TFTP Update Firmware". It contains the following fields:

- TFTP Server IP Address: A text input field containing "192.168.0.2".
- Firmware File Name: A text input field containing "Image.bin".

At the bottom right is an "Apply" button.

Figure 5-10: Update TFTP firmware interface

## 5.6.7 Configuration Backup

Serves to restore the saved configuration to the switch. In addition, it allows the user to save the configuration to the TFTP server.

**TFTP Restore Configuration** This menu item allows you to restore the EEPROM parameter from the TFTP server.

- **TFTP SERVER IP ADDRESS:** Enter the IP address of the TFTP server.
- **RESTORE FILE NAME:** Enter the name of the configuration file you wish to restore.
- Click the **Apply** button.

The screenshot shows a window titled "Configuration Backup". At the top, there are two tabs: "TFTP Restore Configuration" (which is highlighted in grey) and "TFTP Backup Configuration". Below the tabs are two input fields: "TFTP Server IP Address" containing "0.0.0.0" and "Restore File Name" which is empty. At the bottom right is a blue "Apply" button.

Figure 5-11: Restore configuration from TFTP interface

**TFTP Backup Configuration** Saves the current EEPROM parameter of the switch to the TFTP server.

- **TFTP SERVER IP ADDRESS:** Enter the IP address of the TFTP server.
- **BACKUP FILE NAME:** Enter the name of the configuration file.
- Click the **Apply** button.

The screenshot shows a window titled "Configuration Backup". At the top, there are two tabs: "TFTP Restore Configuration" and "TFTP Backup Configuration" (which is highlighted in grey). Below the tabs are two input fields: "TFTP Server IP Address" containing "0.0.0.0" and "Backup File Name" which is empty. At the bottom right is a blue "Apply" button.

Figure 5-12: TFTP backup configuration interface

## 5.6.8 System Event Log

The events recorded in the system log are displayed, as shown below.

- Click the **Reload** button to refresh the view.

The screenshot shows the 'System Log' interface. At the top, there are two dropdown menus: 'System Log Client Mode' set to 'Disable' and 'System Log Server IP Address' set to '0.0.0.0'. Below these are several log entries listed in a scrollable text area:

```

16:Jan 1 19:01:26 : Protocol VLAN: NONE at VLAN_MODE 802.1Q
15:Jan 1 19:01:26 : Add Group Name: vlan001 ... VLAN ID: 2 at VLAN_MODE 802.1Q
14:Jan 1 18:48:56 : Set VLAN Operation Mode: 802.1Q!
13:Jan 1 18:48:56 : Set VLAN ID Range: 1~255
12:Jan 1 18:46:56 : Set GVRP Protocol: Disable!
11:Jan 1 18:38:44 : Set VLAN Operation Mode: Port Based!
10:Jan 1 18:38:44 : Set GVRP Protocol: Disable!
9:Jan 1 18:27:22 : Trunking Ports: 01, 02, 03
8:Jan 1 18:27:22 : Work Ports Number: 3
7:Jan 1 18:27:22 : LACP is Disable!
6:Jan 1 18:27:22 : Trunking Group ID: Trunk. 1
5:Jan 1 18:27:18 : Set LACP System Priority: 1
4:Jan 1 17:51:27 : Port.02 --LINKUP--
3:Jan 1 17:51:23 : Port.02 --LINKDOWN--
2:Jan 1 00:00:05 : Port.02 --LINKUP--
1:Jan 1 00:00:05 : Clear System Log Table!

```

At the bottom, there is a dropdown menu for 'Page' set to 'Page.1' and two buttons: 'Reload' and 'Clear'.

Figure 5-13: System log interface

## 5.7 Port

### 5.7.1 Port Status

Check the status of each port which is configured via the user settings, as well as the negotiation results.

- **LINK:** Down means "No connection". UP means "Connection is active".
- **STATE:** Displays the port status. If there is no connection, "OFF" is displayed.

- **NEGOTIATION:** Displays the auto-negotiation status. Config means that the parameter was configured by the user. Actual means that the current port parameter is shown.
- **SPEED DUPLEX:** Specifies the data rate on this port. Config means that the parameter was configured by the user. Actual means that the current port parameter is shown.
- **FLOW CONTROL:** Displays the flow control status in full-duplex mode. Config means that the parameter was configured by the user. Actual means that the current port parameter is shown.
- **BACK PRESSURE:** Displays the back pressure status. Config means that the parameter was configured by the user. Actual means that the current port parameter is shown.
- **BANDWIDTH:** Displays the bandwidth for incoming and outgoing data traffic on each port.
- **PRIORITY:** Displays the static port priority status.

- **SECURITY:** Displays the port security status.

Port Status																
Port	Type	Link	State	Negotiation		Speed Duplex		Flow Control		Back Pressure		Band Width		Priority	Security	
				Config	Actual	Config	Actual	Config	Actual	Config	Actual	In	Out			
Port.01	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.02	100TX	Up	Enable	Auto	Auto	100 Full	100 Full	ON	ON	ON	OFF	OFF	OFF	Disable	OFF	
Port.03	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.04	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.05	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.06	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.07	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.08	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.09	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.10	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.11	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.12	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.13	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.14	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.15	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.16	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.17	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.18	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.19	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.20	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.21	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.22	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.23	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.24	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.25	Auto	Down	Enable	Auto	N/A	1G Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	
Port.26	Auto	Down	Enable	Auto	N/A	1G Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF	

Figure 5-14: Port status interface

### 5.7.2 Port Statistics

Displays current statistical information on the port.

- To display further port statistics, scroll down.

- Click the **Clear** button to delete all counters.

Port Statistics											
Port	Type	Link	State	Tx Good Packet	Tx Bad Packet	Rx Good Packet	Rx Bad Packet	Tx Abort	Packet Collision		
Port.01	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.02	100TX	Up	Enable	753	0	1361	0	0	0	0	
Port.03	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.04	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.05	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.06	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.07	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.08	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.09	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.10	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.11	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.12	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.13	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.14	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.15	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.16	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.17	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.18	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.19	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.20	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.21	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.22	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.23	100TX	Down	Enable	0	0	0	0	0	0	0	
Port.24	100TX	Down	Enable	0	0	0	0	0	0	0	

Figure 5-15: Port statistics interface

### 5.7.3 Port Controls

Allows you to change the port status.

- Select the port by scrolling through the **Port** column.
- STATE:** Serves to enable or disable the port control.
- NEGOTIATION:** There are three auto-negotiation modes: Auto, N-way (performs auto-negotiation for speed and duplex mode), and Force.
- SPEED:** Allows you to set the speed on each port.
- DUPLEX:** Here, you can determine the full-duplex or half-duplex mode for the port.
- FLOW CONTROL:** Allows you to set the flow control in full-duplex mode to ON or OFF.

- **BACK PRESSURE:** Allows you to set the back pressure procedure in full-duplex mode to ON or OFF.
- **BAND WIDTH:** All ports support the control of the ingress and egress data rate at the ports. Assuming a data rate of 10 Mbps for port 1, for instance, the user can set the effective egress data rate of these ports to 1 Mbps and the ingress data rate to 500 kbps. The switch performs flow control or a back pressure procedure to keep the ingress data rate at the specified rate.
  - **In:** Enter the ingress data rate on the port. Valid parameters are 0-999. The parameter can be set in increments of 100 K. 0 disables the data rate control.
  - **Out:** Enter the egress data rate on the port. Valid parameters are 0-999. The parameter can be set in increments of 100 K. 0 disables the data rate control.
- **PRIORITY:** The static priority is port-based. If you assign a high priority to the port, all incoming frames on the port will always be treated at high priority.
- **SECURITY:** If the security mode is enabled on the port, the port is "blocked", and address learning is suppressed. Incoming packets will be forwarded normally only if they have static MAC addresses that are already present in the address table. You can prevent the port from learning new MAC addresses and then define a list of static MAC addresses which are to be allowed to access the secure port.
- Select **Apply** to apply the configuration.

- The current port configuration will also be displayed when you select the port.

Port Controls											
Port	State	Negotiation	Speed	Duplex	Flow Control	Back Pressure	Band Width	In	Out	Priority	Security
Port.01											
Port.02	Enable	Auto	100	Full	ON	OFF	0	0	0	Disable	<input type="checkbox"/>
Port.03											
Port.04											
<input type="button" value="Apply"/>											
Port Type	Link State	Negotiation	Speed	Duplex	Flow Control	Back Pressure	Band Width	In	Out	Priority	Security
Config	Actual	Config	Actual	Config	Actual	Config	Actual	In	Out	Priority	Security

Figure 5-16: Port control interface

### 5.7.4 Trunking

The Link Aggregation Control Protocol (LACP) permits the standardized information exchange between partner systems on a trunk. In the process, it enables the link aggregation control instances of both systems to negotiate the identity of the aggregation group to which the link belongs, to assign the link to this link aggregation group and to ensure that the transfer and receipt of data on this link works without fault. 4 consecutively arranged ports can be combined to a single dedicated connection by means of trunk groups. This feature serves to extend the bandwidth provided for a device in the network. **LACP requires the full-duplex mode**. For further details, see Standard IEEE 802.3ad.

#### Trunk Group Settings

- SYSTEM PRIORITY:** This value is used to identify active LACP. The switch with the lowest value has the highest priority and is selected as active LACP.
- GROUP ID:** There are three configurable trunk groups. Select the "Group ID" and click the **Select** button.
- LACP:** If this option has been enabled, the group is a static LACP trunk group. If this option has been disabled, the group is a static local LACP trunk group. All ports support dynamic LACP trunk groups. If a connection

is set up to a device which supports LACP, a dynamic LACP trunk group is automatically created.

- **WORK PORTS:** A maximum of 4 ports can be aggregated simultaneously. If a static LACP trunk group is configured, all excess ports are set to the stand-by mode and are added to the group if a work port breaks down. In the case of local static trunk groups, the number of ports has to match the number of member ports.
- Select the ports which are to be added to a trunk group. A maximum of 4 ports can be aggregated simultaneously.
- Select <<Apply>> to add the port.
- To remove a port, click the Remove button.
- When LACP is activated, you can configure the LACP active / passive status of each port in section **Aggregator State Activity**.
- Click the **Apply** button.
- To remove a trunk group, click the **Delete** button. Select the group ID and click the **Delete** button.

### Trunking - Aggregator Setting

Aggregator Setting	Aggregator information	State Activity																		
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="3" style="text-align: center; padding: 2px;">System Priority</td> </tr> <tr> <td colspan="3" style="text-align: center; padding: 2px;"><input type="text" value="1"/></td> </tr> <tr> <td style="width: 20%; padding: 2px;">Group ID</td> <td style="width: 20%; padding: 2px;"><input type="text" value="Trunk.1"/></td> <td style="width: 60%; padding: 2px; text-align: right;"><input type="button" value="Select"/></td> </tr> <tr> <td style="width: 20%; padding: 2px;">Lacp</td> <td style="width: 20%; padding: 2px;"><input type="button" value="Disable"/></td> <td style="width: 60%; padding: 2px; text-align: right;"></td> </tr> <tr> <td style="width: 20%; padding: 2px;">Work Ports</td> <td style="width: 20%; padding: 2px;"><input type="text" value="3"/></td> <td style="width: 60%; padding: 2px; text-align: right;"></td> </tr> <tr> <td style="width: 20%; padding: 2px; vertical-align: top;"> <input checked="" type="checkbox" value="Port.01"/> Port.01  <input checked="" type="checkbox" value="Port.02"/> Port.02  <input checked="" type="checkbox" value="Port.03"/> Port.03         </td> <td style="width: 20%; padding: 2px; text-align: center;"> <input type="button" value="&lt;&lt;Add&gt;&gt;"/>  <input type="button" value="Remove"/> </td> <td style="width: 60%; padding: 2px; text-align: right;"> <input type="button" value="Port.04"/>  <input type="button" value="Port.05"/>  <input type="button" value="Port.06"/>  <input type="button" value="Port.07"/>  <input type="button" value="Port.08"/>  <input type="button" value="Port.09"/>  <input type="button" value="Port.10"/>  <input type="button" value="Port.11"/>  <input type="button" value="Port.12"/> </td> </tr> </table>			System Priority			<input type="text" value="1"/>			Group ID	<input type="text" value="Trunk.1"/>	<input type="button" value="Select"/>	Lacp	<input type="button" value="Disable"/>		Work Ports	<input type="text" value="3"/>		<input checked="" type="checkbox" value="Port.01"/> Port.01 <input checked="" type="checkbox" value="Port.02"/> Port.02 <input checked="" type="checkbox" value="Port.03"/> Port.03	<input type="button" value="&lt;&lt;Add&gt;&gt;"/> <input type="button" value="Remove"/>	<input type="button" value="Port.04"/> <input type="button" value="Port.05"/> <input type="button" value="Port.06"/> <input type="button" value="Port.07"/> <input type="button" value="Port.08"/> <input type="button" value="Port.09"/> <input type="button" value="Port.10"/> <input type="button" value="Port.11"/> <input type="button" value="Port.12"/>
System Priority																				
<input type="text" value="1"/>																				
Group ID	<input type="text" value="Trunk.1"/>	<input type="button" value="Select"/>																		
Lacp	<input type="button" value="Disable"/>																			
Work Ports	<input type="text" value="3"/>																			
<input checked="" type="checkbox" value="Port.01"/> Port.01 <input checked="" type="checkbox" value="Port.02"/> Port.02 <input checked="" type="checkbox" value="Port.03"/> Port.03	<input type="button" value="&lt;&lt;Add&gt;&gt;"/> <input type="button" value="Remove"/>	<input type="button" value="Port.04"/> <input type="button" value="Port.05"/> <input type="button" value="Port.06"/> <input type="button" value="Port.07"/> <input type="button" value="Port.08"/> <input type="button" value="Port.09"/> <input type="button" value="Port.10"/> <input type="button" value="Port.11"/> <input type="button" value="Port.12"/>																		
<input type="button" value="Apply"/> <input type="button" value="Delete"/>																				

Figure 5-17: Settings for trunk aggregation at the port interface

**Information on Trunk Aggregation** When setting LACP trunk aggregation, the corresponding information will be displayed here.

Trunking - Aggregator Information								
Aggregator Setting	Aggregator information	State Activity						
<table border="1"><tr><td colspan="2">Static Trunking Group</td></tr><tr><td>Group Key</td><td>1</td></tr><tr><td>Port Member</td><td>1-1 1-2 1-3</td></tr></table>			Static Trunking Group		Group Key	1	Port Member	1-1 1-2 1-3
Static Trunking Group								
Group Key	1							
Port Member	1-1 1-2 1-3							

Figure 5-18: Information on trunk aggregation at the port interface

**Aggregator State** After setting LACP trunk aggregation, configure the activity state of the port.

**Activity**

- **ACTIVE:** The port transfers LACP protocol packets automatically.
- **PASSIVE:** The port does not transfer LACP protocol packets automatically. The port replies only if it receives an LACP protocol packet from a device at the opposite end.
- Click **Apply** to change the activity status of the port.



**Note**

1. A link which has either two active LACP ports or one active port is able to perform dynamic LACP trunk aggregation.
2. If a link has two passive LACP ports, it cannot perform dynamic LACP trunk aggregation, since both ports will wait for an LACP protocol packet to be sent from a device at the opposite end.
3. If LACP-capable remote end of the trunk has been enabled, the status will automatically be set to "active" as soon as the user selects a trunk port.

Trunking - State Activity					
Aggregator Setting		Aggregator information		State Activity	
Port	LACP State Activity	Port	LACP State Activity		
1	<input checked="" type="checkbox"/> Active	2	<input checked="" type="checkbox"/> Active		
3	<input checked="" type="checkbox"/> Active	4	<input checked="" type="checkbox"/> Active		
5	N/A	6	N/A		
7	N/A	8	N/A		
9	N/A	10	N/A		
11	N/A	12	N/A		
13	N/A	14	N/A		
15	N/A	16	N/A		
17	N/A	18	N/A		
19	N/A	20	N/A		
21	N/A	22	N/A		
23	N/A	24	N/A		
25	N/A	26	N/A		

Figure 5-19: Trunk aggregation—activity state interface

### 5.7.5 Port Mirroring

Port mirroring is a method to monitor the data traffic in switched networks. Data traffic which goes over various ports can be monitored from one specific port.

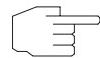
This means that data traffic, which is received on or transferred from a monitored port, is duplicated on the mirrored port.

**Port Mirroring**

Port Mirroring State :	Disable
Analysis Port :	None
Monitor Port	State
Port.04	■
Port.05	■
Port.06	■
Port.07	■
Port.08	■
Port.09	■
Port.10	■
Port.11	■
Port.12	■
Port.13	■
Port.14	■
Port.15	■
Port.16	■
Port.17	■
Port.18	■
Port.19	■
Port.20	■
Port.21	■
Port.22	■
Port.23	■
Port.24	■
Port.25	■
Port.26	■
Trunk.1	■

Figure 5-20: Port mirroring interface

- **PORT MIRRORING STATE:** Allows you to set the port mirroring mode: Disable, RX, TX, and both.
- **ANALYSIS PORT:** The entire monitored data traffic of the port can be seen from the analysis port. You can connect the mirrored port to a LAN analyzer or to Netxray.
- **MONITOR PORT:** The port to be monitored. The data traffic on all monitored ports is copied to the mirrored port (up to 25 ports can be monitored).

**Note**

To disable the function, set the Select Monitor Port option to None.

## 5.8 Protocol

### 5.8.1 VLAN Configuration

A virtual LAN (VLAN) is a logical network group which delimits the broadcast domain. It allows traffic in the network to be isolated so that VLAN subscribers only receive data traffic from subscribers of the same VLAN. The setup of a VLAN from a switch corresponds in principle to the connection of a group of network devices to another layer-2 switch. All network devices, however, are still physically connected to the same switch.

The switch supports port-based, 802.1Q (tag-based) and protocol-based VLAN over the Web management Web page. The VLAN function is disabled in the default configuration.

**Note**

If you have changed the VLAN mode, you will have to restart the switch.

**Port-based VLAN**

Packets are only transferred between subscribers of the same VLAN group. Please note that all ports which have not been selected are treated as if they belonged to another, unconnected VLAN. If the port-based VLAN function is enabled, VLAN tagging will be ignored.

To enable an end device to transfer packets into other VLANs, it must either be able to mark the packets to be sent with VLAN tags or it has to be connected to a VLAN-capable bridge. This bridge must be able to classify and tag packets with other VLAN IDs. This does not only apply to VLAN IDs based on standard-

ized PVIDs, but also to all other information referring to the packet, such as the protocol.

- Click the **Configuration** hyperlink to call up the VLAN configuration interface.

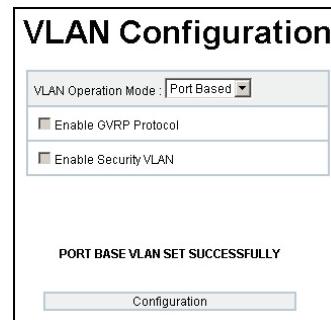


Figure 5-21: Port-based VLANs interface

- If you click the **Apply** button, you will create a new VLAN group.

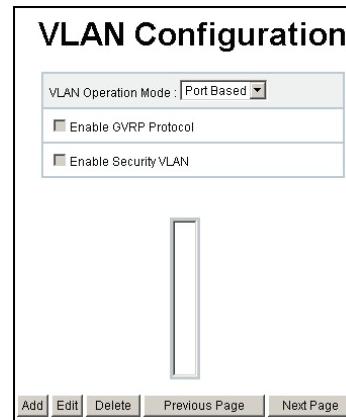


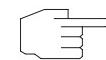
Figure 5-22: Adding port-based VLANs interface

- Enter the name of the group and the VLAN ID and select the subscribers of the VLAN group.
- Click the **Apply** button.

**VLAN Configuration**

VLAN Operation Mode : Port Based <input type="button" value="▼"/> <input checked="" type="checkbox"/> Enable GVRP Protocol	
<input type="checkbox"/> Enable Security VLAN	
Group Name	<input type="text"/>
VLAN ID	<input type="text" value="1"/>
Port.04 Port.05 Port.06 Port.07 Port.08 Port.09 Port.10 Port.11 Port.12 Port.13 Port.14 Port.15	<input type="button" value="Add&gt;&gt;"/> <input type="button" value="&lt;&lt;Remove"/>
<input type="button" value="Apply"/>	

- The VLAN groups are displayed in a table.
- To call up the VLAN groups on the next page, click **Next Page**.
- To remove a VLAN group, click the **Delete** button.
- To modify a VLAN group, click the **Edit** button.


**Note**

When you have finished configuring the trunk groups, they will appear in the port list (e. g. Trunk1, Trunk2, ...). You can also configure the trunk group as VLAN\_Member.

**802.1Q VLAN** Standard IEEE 802.1Q specifies tag-based VLANs. On the basis of this standardization, it is possible to set up a VLAN comprising switches of different vendors. VLANs which are configured according to Standard IEEE 802.1Q insert

tags into Ethernet frames. The tag contains a VLAN Identifier (VID), which specifies the VLAN number.

The user can set up tag-based VLANs and, in the process, enable or disable the GVRP protocol. There are 256 configurable VLAN groups. If you activate 802.1Q VLAN, all ports of the switch will belong to the default VLAN. The VID is 1. The default VLAN cannot be deleted.

GVRP permits the automatic configuration of a VLAN between the switch and the node. If the switch is connected to a device where GVRP has been enabled, you can send a GVRP request and use the VID of the VLAN, which has been defined on the switch. The switch will then add the device automatically to the existing VLAN.

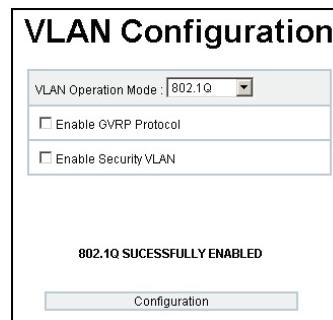


Figure 5-23: 802.1Q VLAN interface

- Click the **Configuration** hyperlink to call up the VLAN configuration interface.
- **ENABLE GVRP PROTOCOL:** Check the checkbox in order to activate the GVRP protocol.
- **ENABLE SECURITY VLAN SETTING:** Check the checkbox in order to activate the security VLAN. If you enable the security VLAN, the switch can be accessed only by members of these VLANs. To configure the security VLAN, please perform the steps in section **Basic** below. After finishing the security VLAN configuration, you can create more VLANs.



You can create only one security VLAN.

**Note**

**Basic**

- Click the **Add** button.
- **GROUP NAME:** Assign a name to the VLAN.
- **VLAN ID:** Enter a VLAN ID (2-4094). The default is 1.
- **PROTOCOL VLAN:** Select the protocol type. The default is NONE.

**VLAN Configuration**

VLAN Operation Mode : <input type="button" value="802.1Q"/>
<input type="checkbox"/> Enable GVRP Protocol
<input type="checkbox"/> Enable Security VLAN

**Basic**      **Port VLAN ID**

DEFAULT_1
-----------

**Add** **Edit** **Delete** **Previous Page** **Next Page**

Figure 5-24: Adding a 802.1Q VLAN interface

- Select the ports, and click **Add**. If trunk groups have been configured, they will appear in the port list (e. g. Trunk1, Trunk2, ...). You can also configure the trunk group as a VLAN member.

### VLAN Configuration

VLAN Operation Mode : 802.1Q												
<input type="checkbox"/> Enable GVRP Protocol												
<input type="checkbox"/> Enable Security VLAN												
<b>Basic</b>	<b>Port VID</b>											
<table border="1" style="width: 100%; border-collapse: collapse;"><tr><td style="width: 20%;">Group Name</td><td style="width: 80%;"><input type="text"/></td></tr><tr><td>VLAN ID</td><td><input type="text" value="1"/></td></tr><tr><td>Protocol VLAN</td><td><input type="button" value="NONE"/></td></tr></table>	Group Name	<input type="text"/>	VLAN ID	<input type="text" value="1"/>	Protocol VLAN	<input type="button" value="NONE"/>	<table border="1" style="width: 100%; border-collapse: collapse;"><tr><td style="width: 20%; vertical-align: top; padding-right: 10px;"><div style="border: 1px solid #ccc; padding: 2px; display: scroll; height: 150px; width: 100%;"><ul style="list-style-type: none"><li>Port 04</li><li>Port 05</li><li>Port 06</li><li>Port 07</li><li>Port 08</li><li>Port 09</li><li>Port 10</li><li>Port 11</li><li>Port 12</li><li>Port 13</li><li>Port 14</li><li>Port 15</li></ul></div></td><td style="width: 60%; padding: 10px; vertical-align: top;"><table border="1" style="width: 100%; border-collapse: collapse;"><tr><td style="width: 50%; text-align: center; padding: 5px;"><input type="button" value="Add &gt;&gt;"/></td><td style="width: 50%; text-align: center; padding: 5px;"><input type="button" value="&lt;&lt; Remove"/></td></tr></table></td><td style="width: 20%;"></td></tr></table>	<div style="border: 1px solid #ccc; padding: 2px; display: scroll; height: 150px; width: 100%;"><ul style="list-style-type: none"><li>Port 04</li><li>Port 05</li><li>Port 06</li><li>Port 07</li><li>Port 08</li><li>Port 09</li><li>Port 10</li><li>Port 11</li><li>Port 12</li><li>Port 13</li><li>Port 14</li><li>Port 15</li></ul></div>	<table border="1" style="width: 100%; border-collapse: collapse;"><tr><td style="width: 50%; text-align: center; padding: 5px;"><input type="button" value="Add &gt;&gt;"/></td><td style="width: 50%; text-align: center; padding: 5px;"><input type="button" value="&lt;&lt; Remove"/></td></tr></table>	<input type="button" value="Add &gt;&gt;"/>	<input type="button" value="&lt;&lt; Remove"/>	
Group Name	<input type="text"/>											
VLAN ID	<input type="text" value="1"/>											
Protocol VLAN	<input type="button" value="NONE"/>											
<div style="border: 1px solid #ccc; padding: 2px; display: scroll; height: 150px; width: 100%;"><ul style="list-style-type: none"><li>Port 04</li><li>Port 05</li><li>Port 06</li><li>Port 07</li><li>Port 08</li><li>Port 09</li><li>Port 10</li><li>Port 11</li><li>Port 12</li><li>Port 13</li><li>Port 14</li><li>Port 15</li></ul></div>	<table border="1" style="width: 100%; border-collapse: collapse;"><tr><td style="width: 50%; text-align: center; padding: 5px;"><input type="button" value="Add &gt;&gt;"/></td><td style="width: 50%; text-align: center; padding: 5px;"><input type="button" value="&lt;&lt; Remove"/></td></tr></table>	<input type="button" value="Add &gt;&gt;"/>	<input type="button" value="&lt;&lt; Remove"/>									
<input type="button" value="Add &gt;&gt;"/>	<input type="button" value="&lt;&lt; Remove"/>											
<input type="button" value="Next"/>												

- Click **Next** to call up the following page:

**VLAN Configuration**

VLAN Operation Mode :	802.1Q		
<input type="checkbox"/> Enable GVRP Protocol			
<input type="checkbox"/> Enable Security VLAN			
VLAN Name	vlan001		
VLAN ID	2		
Untag Member			
Port.04	Untag	Port.05	Untag
Port.06	Untag		
<b>Apply</b>			

- Select whether or not the outgoing frames are to be VLAN-tagged:
  - **TAG**: Outgoing frames are given a VLAN-tag.
  - **UNTAG**: Outgoing frames are not given a VLAN-tag.
- Click the **Apply** button.

#### Port VID: VID Configuration

- **VLAN ID**: Define the port VLAN ID to be used for untagged data traffic on a specific port. This option is useful for integrating devices belonging to the VLAN, but which do not support tagging. You can assign a port VLAN ID to every port (supported values are 1-255; the default VLAN ID is 1). The port VLAN ID must correspond to the VLAN to which the port was assigned. Otherwise, the untagged data traffic will be discarded.
- **INGRESS FILTER**: You can have frames of a specific VLAN forwarded over an ingress filter if the port belongs to this VLAN.
  - **ENABLE**: Packets need to have the VID of this port to be forwarded.
  - **DISABLE**: Disables the ingress filter function.
- **ACCEPTABLE FRAME TYPE**:
  - **ALL**: All packets are accepted.

- **TAG ONLY:** Packets need to have the right VID to be forwarded over the port.
- Click the **Apply** button.

The screenshot shows the 'VLAN Configuration' page. At the top, there are three checkboxes: 'VLAN Operation Mode : 802.1Q' (selected), 'Enable GVRP Protocol' (unchecked), and 'Enable Security VLAN' (unchecked). Below this is a table with two tabs: 'Basic' (selected) and 'Port VLAN ID'. The 'Basic' tab has fields for Port (Port.04), Port VLAN ID (1), Ingress Filter (Enable), Acceptable Frame Type (All), and VLAN ID Range (1~255). The 'Port VLAN ID' tab shows a single row for Port.04 with VLAN ID 1, Ingress Filter set to Enable, and Acceptable Frame Type set to All. At the bottom are 'Apply' and 'Default' buttons.

Basic					Port VLAN ID
Port	Port VLAN ID	Ingress Filter	Acceptable Frame Type	VLAN ID Range	
Port.04 Port.05 Port.06 Port.07	1	Enable	All	1~255	

Port	VLAN ID	Ingress Filter	Acceptable Frame Type
Port.04	1	Enable	All

Figure 5-25: Adding a VID to a 802.1q VLAN interface

### 5.8.2 Rapid Spanning Tree

The Rapid Spanning Tree Protocol (RSTP) is a standardized method (IEEE 802.1w) that is used to prevent loops in switched networks. Enabling RSTP makes sure that there is no more than one path active between any two nodes in the network. We recommend activating RSTP on all switches to make sure that there is no more than one active path in the network.

#### System Configuration

- In addition, root bridge information on Rapid Spanning Tree will be displayed here.
- Changing the RSTP state:
  - **PRIORITY (0-65535):** The bridge with the lowest parameter has the highest priority and will be selected as the root when the parameter is changed. The system must be restarted to specify the priority value of

paths. According to the standard protocol, the value must be a multiple of 4096.

- **MAX AGE (6-40):** Duration in seconds (6 to 40) that protocol information received on a port is stored by the switch.
- **HELLO TIME (1-10):** Definition of a time slot from 1 to 10 s, during which the switch transfers hello broadcasts to other switches.
- **FORWARD DELAY TIME (4-30):** Duration in seconds of the listening and learning states before the port starts the forwarding.

- Click the **Apply** button.

The screenshot shows a web-based management interface for configuring the Spanning Tree protocol. It has two main sections: 'System Configuration' and 'Per Port Configuration'. In the 'System Configuration' section, the 'RSTP Mode' is set to 'Disabled'. The 'Priority (0-61440)' is set to 32768. The 'Max Age (6-40)' is set to 20, 'Hello Time (1-10)' is set to 2, and 'Forward Delay Time (4-30)' is set to 15. Below these fields, there are validation messages: 'Priority must be a multiple of 4096', '2\*(Forward Delay Time + 1) should be greater than or equal to Max Age', and 'Max Age should be greater than or equal to 2\*(Hello Time + 1)'. An 'Apply' button is located below these messages. The 'Per Port Configuration' section is collapsed. Below the configuration sections, there is a 'Root Bridge Information' table with the following data:

Root Bridge Information	
Bridge ID	0000000000000000
Root Port	Root
Root Path Cost	0
Max Age	20
Hello Time	2
Forward Delay	15

Figure 5-26: Spanning Tree system configuration interface

**Per Port Configuration** Configure the path costs and the priority on each port.

- Select the **Port** from the corresponding column.
- **PATH COST:** Specifies the path costs of the port, which the switch uses to determine which ports are forwarding ports.
- **PRIORITY:** Refers to the port priority. Allows you to define how probable it is for this port to become the root port.

- Click the **Apply** button.

**Spanning Tree**

System Configuration			Per Port Configuration		
Port	Path Cost (1-200000000)	Priority (0-240)	Admin P2P	Admin Edge	Admin Non Stp
Port.04 Port.05 Port.06 Port.07 Port.08	10	128	Auto	True	False

priority must be a multiple of 16

**RSTP Port Status**

Port	Path Cost	Port Priority	Admin P2P	Admin Edge	Stp Neighbor	State	Role
Port.04	20000	128	True	True	False	Disabled	Disabled
Port.05	20000	128	True	True	False	Disabled	Disabled
Port.06	20000	128	True	True	False	Disabled	Disabled
Port.07	20000	128	True	True	False	Disabled	Disabled
Port.08	20000	128	True	True	False	Disabled	Disabled
Port.09	20000	128	True	True	False	Disabled	Disabled
Port.10	20000	128	True	True	False	Disabled	Disabled
Port.11	20000	128	True	True	False	Disabled	Disabled
Port.12	20000	128	True	True	False	Disabled	Disabled
Port.13	20000	128	True	True	False	Disabled	Disabled
Port.14	20000	128	True	True	False	Disabled	Disabled
Port.15	20000	128	True	True	False	Disabled	Disabled
Port.16	20000	128	True	True	False	Disabled	Disabled
Port.17	20000	128	True	True	False	Disabled	Disabled
Port.18	20000	128	True	True	False	Disabled	Disabled
Port.19	20000	128	True	True	False	Disabled	Disabled
Port.20	20000	128	True	True	False	Disabled	Disabled
Port.21	20000	128	True	True	False	Disabled	Disabled
Port.22	20000	128	True	True	False	Disabled	Disabled
Port.23	20000	128	True	True	False	Disabled	Disabled
Port.24	20000	128	True	True	False	Disabled	Disabled
Port.25	20000	128	True	True	False	Disabled	Disabled
Port.26	20000	128	True	True	False	Disabled	Disabled
Trunk.1	20000	128	True	True	False	Disabled	Disabled

Figure 5-27: RSTP configuration per port interface

### 5.8.3 SNMP Management

SNMP is a protocol which regulates the information transfer between management and agent. The switch supports SNMP V1.

You can define management stations as trap managers and enter SNMP community strings.

**SYSTEM OPTIONS:** Allows you to enter a name for the switch, as well as a location and contact name.

- **NAME:** Assign a name to the switch.
- **LOCATION:** Physical location of the switch
- **CONTACT:** Enter the name of a contact person or organization.

The screenshot shows the 'SNMP Management' interface. At the top is a 'System Options' section with three input fields: 'Name', 'Location', and 'Contact', each with a corresponding text input box. Below this is an 'Apply' button. The next section is 'Community Strings', which includes a table for 'Current Strings' containing 'public\_\_RO' and 'private\_\_RW'. It also has an 'Add' button, a 'Remove' button, and a 'New Community String' section with a 'String' input field and two radio buttons for 'RO' and 'RW'. The final section is 'Trap Managers', featuring a table for 'Current Managers' with '(none)' listed. It includes an 'Add' button, an 'IP Address' input field, and a 'Community' input field.

Figure 5-28: SNMP management interface

**COMMUNITY STRINGS:** Serve as password.

- **STRINGS:** Enter the name of the string.
- **RO:** Enables requests with this string to display information on MIB objects (read-only access).
- **RW:** Enables requests with this string to display information on MIB objects and to create MIB objects (read and write access rights).
- Click the **Add** button.

## Trap Manager

A trap manager is a management station which receives traps. Traps are system alerts created by the switch. If no trap manager has been defined, no traps will be created. To create a trap manager, enter the IP address of the end device and a community string.

- **IP ADDRESS:** Enter the IP address of the trap device.
- **COMMUNITY STRINGS:** Community strings of the trap device
- Click the **Add** button.

## 5.9 Security

### 5.9.1 Forwarding and Filtering

**IGMP Snooping** The switch supports IP multicast. If you have activated IGMP on the Switch Settings Advanced page in Web Management, the IGMP snooping information will be displayed here. You will find the various multicast group VIDs and member ports. The IP multicast address range extends from 224.0.0.0 to 239.255.255.255.

The Internet Group Management Protocol (IGMP) is an internal protocol of the Internet Protocol (IP) Suite. The Internet Protocol implements multicast data traffic by the application of switches, routers, and hosts which support IGMP. The application of IGMP enables the port to detect IGMP-based requests and messages and to administrate IP multicast traffic over the switch. As a matter of principle, IGMP uses 3 types of messages, as described in the following table:

Message	Description
Query	This is a query transmitted by a querying party (IGMP router or switch). It is used to request a reply from each host which belongs to the multicast group.
Report	This is a message which the host sends to a querying party to signal that the host is a member of the group specified in the report message or wants to become a member.
Leave Group	This is a message which the host sends to a querying party to signal that it is no longer a member of a specific multicast group.

If IGMP snooping is activated, the corresponding information will be displayed here.

The screenshot shows a web-based management interface titled "Forwarding and Filtering". At the top, there are three tabs: "IGMP Snooping" (which is selected), "Static MAC Addresses", and "MAC Filtering". Below the tabs is a table with columns for "IP Address", "VLAN ID", and "Member Port". There is one row in the table with a single cell containing a vertical line. At the bottom of the interface is a section labeled "IGMP Protocol" with a dropdown menu currently set to "Disable". A large "Apply" button is located at the bottom right.

Figure 5-29: IGMP snooping interface

**Static MAC Address** Insert a static MAC address which will remain in the address table of the switch, independent of whether or not the device is physically connected to the switch. The switch will not have to learn the MAC address of the device again if the latter is operated in the network once more after a connection breakdown or after the device was switched off.

- **MAC ADDRESS:** Enter the MAC address of the port to and from which the port should permanently forward the data traffic, independent of the device activity in the network.
- **PORT NUMBER:** Select the port number.
- **VLAN ID:** If tag-based VLANs (according to IEEE 802.1Q) have been defined on the switch, static addresses are allocated to individual VLANs. Enter the VID (of tag-based VLANs) to allocate them to the MAC addresses.
- Click the **Add** button.
- To delete a MAC address, click the **Delete** button.

### Forwarding and Filtering

IGMP SnoopingStatic MAC AddressesMAC Filtering

MAC Address	Port	VLAN ID

MAC Address	<input type="text"/>
Port No.	<input type="text" value="Port.04"/>
VLAN ID	<input type="text"/>

Add Delete

Figure 5-30: Interface for the configuration of static MAC addresses

#### MAC Filtering

The filter option for MAC addresses enables the switch to filter undesirable traffic. The data traffic will then be filtered based on the destination address.

- **MAC ADDRESS:** Enter the MAC address you wish to filter.
- **VLAN ID:** If tag-based VLANs (according to IEEE 802.1Q) have been defined on the switch, enter the VID into the VLAN ID field to allocate it to a MAC address.

- Click the **Add** button.
- To delete a MAC address, click the **Delete** button.

MAC Address	VLAN ID
00:0C:29:00:00:01	1

MAC Address  VLAN ID

MAC Address   
VLAN ID

Figure 5-31: Filtering of MAC addresses interface

### 5.9.2 802.1X Configuration

If the IEEE 802.1X protocol is activated, you can configure the 802.1X parameters. To activate the IEEE 802.1X protocol, go to **Administrator -> Switch Setting -> Misc Config**.

#### System Configuration

- **RADIUS SERVER IP:** Determines the IP address of the Radius server.
- **SERVER PORT:** Defines the UDP destination port to be used for authentication requests to the specified Radius server.
- **ACCOUNTING PORT:** Defines the UDP destination port to be used for billing requests to the specified Radius server.
- **SHARED KEY:** Defines an encryption key to be used for authentication requests to the specified Radius server. This key must match the encryption key on the Radius server.
- **NAS, IDENTIFIER:** Defines the ID for the Radius client.

- Click the **Apply** button.

### 802.1x Configuration

System Configuration	Per Port Configuration	Misc Configuration
Radius Server IP	<input type="text" value="192.168.0.3"/>	
Server Port	<input type="text" value="1812"/>	
Accounting Port	<input type="text" value="1813"/>	
Shared Key	<input type="text" value="12345678"/>	
NAS, Identifier	<input type="text" value="NAS_L2_SWITCH"/>	

Figure 5-32: 802.1x system configuration interface

#### Per Port Configuration

- Select the **Port** from the corresponding column.
- Select the activity status of the port.
  - **REJECT**: The specified port has to remain in an unauthorized state.
  - **ACCEPT**: The specified port has to remain in an authorized state.
  - **AUTHORIZED**: The specified port is either set to "authorized" or "unauthorized". The state depends on the result of the authentication process which is performed between the supplicant and the authentication server.
  - **DISABLE**: The specified port has to remain in an authorized state.
- Click the **Apply** button.

- The authorization information of each port is displayed in a table.

**802.1x Configuration**

System Configuration		Per Port Configuration	Misc Configuration																																																						
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Port</th> <th style="width: 90%;">State</th> </tr> </thead> <tbody> <tr><td>Port.01</td><td></td></tr> <tr><td>Port.02</td><td></td></tr> <tr><td>Port.03</td><td></td></tr> <tr><td>Port.04</td><td></td></tr> <tr><td>Port.05</td><td></td></tr> </tbody> </table>	Port	State	Port.01		Port.02		Port.03		Port.04		Port.05		<input style="width: 100%;" type="button" value="Authorize"/>	<input style="width: 100%;" type="button" value="Apply"/>																																											
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<b>Port Authorization</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Port</th> <th style="width: 90%;">State</th> </tr> </thead> <tbody> <tr><td>Port.01</td><td>Disable</td></tr> <tr><td>Port.02</td><td>Disable</td></tr> <tr><td>Port.03</td><td>Disable</td></tr> <tr><td>Port.04</td><td>Disable</td></tr> <tr><td>Port.05</td><td>Disable</td></tr> <tr><td>Port.06</td><td>Disable</td></tr> <tr><td>Port.07</td><td>Disable</td></tr> <tr><td>Port.08</td><td>Disable</td></tr> <tr><td>Port.09</td><td>Disable</td></tr> <tr><td>Port.10</td><td>Disable</td></tr> <tr><td>Port.11</td><td>Disable</td></tr> <tr><td>Port.12</td><td>Disable</td></tr> <tr><td>Port.13</td><td>Disable</td></tr> <tr><td>Port.14</td><td>Disable</td></tr> <tr><td>Port.15</td><td>Disable</td></tr> <tr><td>Port.16</td><td>Disable</td></tr> <tr><td>Port.17</td><td>Disable</td></tr> <tr><td>Port.18</td><td>Disable</td></tr> <tr><td>Port.19</td><td>Disable</td></tr> <tr><td>Port.20</td><td>Disable</td></tr> <tr><td>Port.21</td><td>Disable</td></tr> <tr><td>Port.22</td><td>Disable</td></tr> <tr><td>Port.23</td><td>Disable</td></tr> <tr><td>Port.24</td><td>Disable</td></tr> <tr><td>Port.25</td><td>Disable</td></tr> <tr><td>Port.26</td><td>Disable</td></tr> </tbody> </table>				Port	State	Port.01	Disable	Port.02	Disable	Port.03	Disable	Port.04	Disable	Port.05	Disable	Port.06	Disable	Port.07	Disable	Port.08	Disable	Port.09	Disable	Port.10	Disable	Port.11	Disable	Port.12	Disable	Port.13	Disable	Port.14	Disable	Port.15	Disable	Port.16	Disable	Port.17	Disable	Port.18	Disable	Port.19	Disable	Port.20	Disable	Port.21	Disable	Port.22	Disable	Port.23	Disable	Port.24	Disable	Port.25	Disable	Port.26	Disable
Port	State																																																								
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Figure 5-33: 802.1x Configuration - Per Port Configuration

#### Misc Configuration

- QUIET PERIOD:** Defines the time period during which the port does not accept queries from supplicants.
- TX PERIOD:** Determines the time period during which the port waits to send the next EAPOL PDU during an authentication.
- SUPPLICANT TIMEOUT:** Determines the period of time the switch waits for a supplicant to reply to an EAP request.

- **SERVER TIMEOUT:** Determines the period of time the switch waits for the server to reply to an authentication request.
  - **MAX REQUESTS:** Defines the number of authentication attempts after which the authentication will be regarded as failed and the authentication session will be terminated.
  - **REAUTH PERIOD:** Determines the period of time after which the connected clients have to be re-authenticated.
  - Click the **Apply** button.

System Configuration	Per Port Configuration	Misc Configuration
Quiet Period	<input type="text" value="60"/>	
Tx Period	<input type="text" value="30"/>	
Suplicant Timeout	<input type="text" value="30"/>	
Server Timeout	<input type="text" value="30"/>	
Max Requests	<input type="text" value="2"/>	
Reauth Period	<input type="text" value="3600"/>	

Figure 5-34: 802.1x configuration – Misc interface

## 5.10 UPS Status

Allows you to display information on and configure the Uninterruptible Power Supply (UPS).

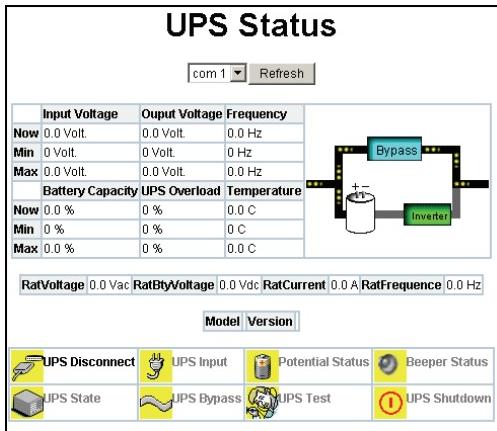


Figure 5-35: Uninterruptible power supply interface

- **UPS INFORMATION:** The information is displayed when the UPS (Uninterruptible Power Supply) is connected to the switch, a regular connection exists, and the UPS is activated.
- Click the **Refresh** button to refresh the view.
  - **INPUT VOLTAGE:** Displays the current value as well as minimum and maximum UPS input voltage.
  - **OUTPUT VOLTAGE:** Displays the current value as well as minimum and maximum UPS output voltage.
  - **FREQUENCY:** Displays the UPS frequency parameter.
  - **BATTERY CAPACITY:** Displays the UPS battery capacity.
  - **UPS OVERLOAD:** Displays the UPS overload capacity.
  - **TEMPERATURE:** Displays the current UPS temperature.
  - **RATVOLTAGE:** Voltage range of the UPS
  - **RATBTYVOLTAGE:** Voltage range of the UPS battery
  - **RATCURRENT:** Current range of the UPS
  - **RATFREQUENCY:** Frequency range of the UPS

- **COMPANY NAME:** Name of the UPS manufacturer
- **MODEL:** Model name of the UPS
- **VERSION:** Internal software version of the UPS



The figure shows the UPS status. If a new status is detected, the color of the icon changes from yellow to red, and the status description is adapted.

## 5.11 Power over Ethernet

Allows you to display POE information and lets you configure the individual ports.

- Select the port and configure it.
- Click the **Apply** button.

- Click the **Refresh** button to refresh the view.

**Power Over Ethernet**

Power Limit Management: <input type="checkbox"/> Enabled    Total Power Limit (W): 369 Firmware: 2.1    Total Power (W): 0.0																
<input type="button" value="Apply"/> <input type="button" value="Refresh"/>																
Port	Enable	Bypass Detection	Power Limit By Classification	Power Limit By Management	Detect Legacy Signature	Priority	Power Limit Max (mW) (<15400)	Fault Status	Mode Status	Discovery R (ohms)	Port Current (mA)	Port Voltage (V)	Port Power (mW)	Class Current (mA)	Determined Class	
1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low	15400	null	V Sample	131068	0	2.5	0	0.0	0:15.4W
2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low	15400	null	V Sample	131068	0	0.0	0	0.0	0:15.4W
3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low	15400	null	R Detect	131068	0	2.3	0	0.0	0:15.4W
4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low	15400	null	R Detect	131068	0	2.2	0	0.0	0:15.4W
5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low	15400	null	R Detect	131068	0	2.3	0	0.0	0:15.4W
6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low	15400	null	R Detect	131068	0	2.3	0	0.0	0:15.4W
7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low	15400	null	R Detect	131068	0	2.4	0	0.0	0:15.4W
8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low	15400	null	R Detect	131068	0	2.2	0	0.0	0:15.4W

port1-8

Figure 5-36: POE status interface

- POWER LIMIT MANAGEMENT:** Lets you enable or disable the POE power management function.
- FIRMWARE:** Indicates the firmware version of the system.
- TOTAL POWER LIMIT:** Displays the power limit provided to PDs via the POE port.
- TOTAL POWER (W):** Displays the total power provided to PDs.

**PORT:** Select the port you wish to configure.

- ENABLE:** Lets you enable or disable the POE on the port.
- POWER LIMIT BY CLASSIFICATION:** Lets you enable or disable the classification function for the output power on the port.

- **POWER LIMIT BY MANAGEMENT:** Lets you enable or disable the port power limit management for the POE power management.
- **Detect Legacy Signature:** Enable this function to be able to supply power to so-called legacy PDs (which do not support Standard IEEE 802.3af).
- **PRIORITY:** Sets the port priority for POE power management. 1 = C (critical), 2 = H (high), 3 = L (low)
- **POWER LIMIT MAX (mW) (<15400):** Allows you to set the output power limit. The maximum must be below 15400.
- **FAULT STATUS:** Displays the PD error status messages. There are the following three error status messages:
  - **NULL:** There is no PD connected, or the status of the connected PD is normal.
  - **OVERLOAD:** The current is above the maximum defined for the PD (475mA @ 48V DC) for more than 50 msec.
- **MODE STATUS:** Displays the current mode status of the PD.
  - **V SAMPLE OR I SAMPLE:** Voltage or intensity of current sample. When the POE switch detects a PD and supplies power to it, it will then monitor the voltage or intensity of current on this port to find out whether or not the PD is still active. This procedure corresponds to IEEE 802.3af.
  - **R DETECT:** If there is no PD connected to the port, the POE switch polls every port and detects the resistance.
- **DISCOVERY R (OHMS):** Displays the resistance.
- **PORT CURRENT (mA):** Displays the current.
- **PORT VOLTAGE (V):** Displays the voltage.
- **PORT POWER (W):** Displays the power in Watt.
- **CLASS CURRENT (mA):** Shows the current in mA for the class.
- **DETERMINED CLASS:** Displays the determined class in numerical format, e.g. 0.1, etc.

## 5.12 Factory Default

Reset button to reset the system to the default settings.

- **DEFAULT IP ADDRESS:** 192.168.0.248
- **DEFAULT GATEWAY:** 0.0.0.0
- **SUBNET MASK:** 255.255.255.0
- Click the **Default** button to reset the switch to its default settings.



Figure 5-37: Default settings interface

## 5.13 System Reboot

Restart the switch via a software reset.

- Click the **Reboot** button to restart the switch.



Figure 5-38: System reboot interface

# 6 Troubleshooting

This section is meant to help you solve the most frequent problems which may occur during the operation of the funkwerk S1224p FastEthernet PoE Switch.

## 6.1 Incorrect Connections

The switch port can automatically detect straight or cross-over cables when the switch is connected with other Ethernet devices. An appropriate UTP or STP cable has to be connected to the RJ-45 connector. 4-wire twisted pair cables are connected to the 10/100 Mbps port. If the RJ-45 connector is not plugged in at the right pin, no connection will be set up. If you are using an optical fiber connection, make sure that the mode of the fiber cable and the mode of the fiber module match.

- |                                |   |
|--------------------------------|---|
| <b>Faulty or Loose Cables</b>  | Make sure that the cables are not plugged in loosely and that no faulty cables are used. If the cables are ok, make sure that all connectors are plugged in correctly. If this does not solve the problem, try another cable.   |
| <b>Non-Standardized Cables</b> | Non-standardized cables or cables with incorrect wire assignment are frequently the cause for network outages, disturbances, or other network problems. They may seriously impair your network performance. For each installation of a 100Base-T network we recommend using the Category 5 Cable Tester as a proven tool for cable testing. |
| <b>RJ-45 Ports:</b>            | Use unscreened twisted pair cables (UTP) or twisted pair cables (STP) for RJ-45 connections: 100 Ω Category 3, 4 or 5 cables for 10 Mbps connections or 100 Ω Category 5 cables for 100 Mbps connections. Moreover, make sure that no twisted pair connection is longer than 100 m.   |

**Faulty Network Topologies** It is very important to make sure that you are working with an admissible and functioning network topology. Frequent faults in the topology consist in excessive cable lengths and the use of too many repeaters (hubs) between the end nodes. Moreover, you should make sure that there are no loops on the data paths in your network topology. There must only be one active connection between any two end nodes. Loops on the data paths cause broadcast storms and seriously decrease the performance of your network.

## 6.2 Error Diagnosis via LEDs

The switch can be monitored in a simple way by means of the LEDs at the device. They indicate frequently occurring problems with which the user is typically confronted and help him to detect and localize faults and problems.

If the power LED is not lit, even though the power cord is plugged in, the socket or the power cord may be defective. If the switch suddenly loses its functionality, you should check whether there are loose cables or whether there are power losses or surges at the socket. If the problem still cannot be solved, please consult your local dealer.

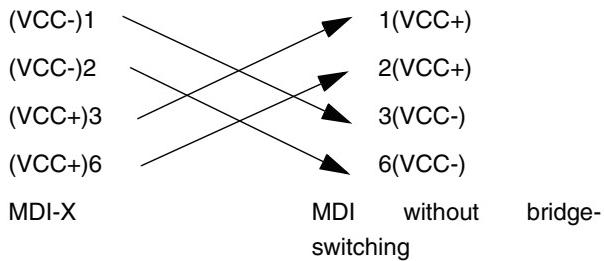
## 6.3 POE Error Troubleshooting

### ■ NO POWER FORWARDING

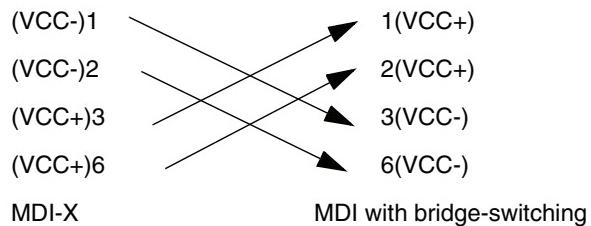
- Make sure that the PD is compatible with Standard IEEE 802.3af. The **funkwerk S1224p FastEthernet PoE Switch** only supports PDs compatible with IEEE 802.3af.
- The POE switch uses the signal-carrying wires to transmit the power. The data and the power are juxtaposed on the pins. Read the documentation provided with your PD to find out which wire pair it uses. The following table shows the pin allocation of the RJ-45 port.

Pin	Signal / Name
1	RX+ / VCC -
2	RX- / VCC -
3	TX+ / VCC +
4	NC
5	NC
6	TX- / VCC +
7	NC
8	NC

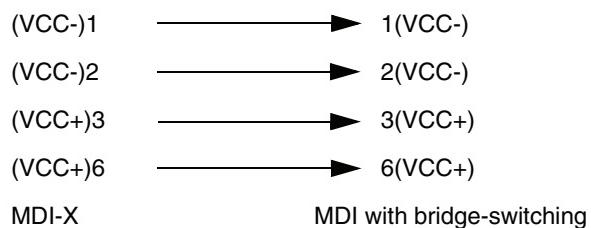
- If the pin allocation of the PD is in MDI mode without bridge-switching function, please use the connecting cable for power and data transmission. For the pin allocation, please refer to the table above.



- If the pin allocation of the PD is in MDI mode with bridge-switching function, please use the straight-forward and cross-over connecting cable for power and data transmission. For a juxtaposition of the pin allocation, please refer to the table above.



*OR*



## 7 Specifications

This section describes the specifications of the **funkwerk S1224p FastEthernet PoE Switch**.

<b>STANDARD</b>	IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX/100BASE-FX IEEE802.3z Gigabit SX/LX IEEE802.3ab Gigabit 1000T IEEE802.3x Flow control and back-pressure procedure IEEE802.3ad Port trunk with LACP IEEE802.1d Spanning Tree Protocol IEEE802.1w Rapid Spanning Tree Protocol IEEE802.1p Class of Service IEEE802.1Q VLAN-tagging IEEE 802.1x user authentication IEEE802.3af Power over Ethernet
<b>LEDs</b>	System power <b>10/100TX RJ-45 PORT:</b> ■ link / activity (green: 1000 Mbps, yellow: 10/100 Mbps), full-duplex / collision <b>MINI GBIC COPPER:</b> ■ link / activity, full-duplex / collision, 1000 Mbps, 100 Mbps
<b>NETWORK PORTS</b>	10/100TX: 24 x RJ-45 Gigabit copper cable: 2 x RJ-45 2 MINI GBIC for MINI GBIC transceiver
<b>RS-232 PORTS</b>	One RS-232 DB-9 jack for switch management Two RS-232 DB-9 plugs

<b>SWITCH ARCHITECTURE</b>	Store-and-forward architecture
<b>BACKPLANE</b>	Up to 8.8 Gbps
<b>MAC ADDRESSES</b>	8 K MAC address table with auto-learning function
<b>MEMORY</b>	3 Mbps for packet buffer
<b>FLASH ROM</b>	512 KBytes x 2
<b>SYSTEM MEMORY</b>	8 Mbytes x 1
<b>DIMENSIONS</b>	440 mm (W) x 280 mm (D) x 44 mm (H)
<b>REMOTE POWER SUPPLY</b>	End point power supply over UTP cable, compatible with IEEE802.3af Power supply per port: 15.4 Watt (maximum)
<b>SYSTEM VOLTAGE</b>	<b>INTEGRATED AC POWER SUPPLY:</b> 90 – 240 V AC, 50/60 Hz, 200 W <b>ADDITIONAL POWER SUPPLY JACK:</b> 48 V DC
<b>POWER CONSUMPTION</b>	20 W (maximum) with additional DC power supply.
<b>VENTILATION</b>	2 DC ventilators with detection function
<b>OPERATING TEMPERATURE</b>	0°C -45°C, 10% -95% relative humidity, not condensing
<b>STORAGE ENVIRONMENT</b>	-40°C -70°C, 95% relative humidity, not condensing
<b>EMI</b>	CE
<b>SECURITY</b>	UL, cUL, CE/EN60950

# 8 Appendix

## 8.1 Pin Assignment at the Console Port

The serial DB-9 port at the front serves to connect the switch in an out-of-band configuration. The menu-driven configuration program can be accessed from an end device or PC which emulates an end device. The pin assignments to be used for connections on the serial ports are given in the following tables.

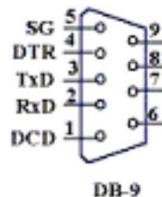


Figure 8-1: Pin numbers at the DB-9 console port

### ■ Pin assignment at the DB-9 console port

EIA Circuit	CCITT Signal	Description	Switch: DB9 DTE Pin #	PC DB9DTE Pin #
BB	104	RxD (received data)	2	2
BA	103	TxD (transferred data)	3	3
AB	102	SGND (signal ground)	5	5

- Connection from the console port to 9-pin end device port on PC

Switch: 9-Pin Serial Port	CCITT Signal PC 9-Pin	End Device Port
2 RXD	<-----RXD ----->	3 TxD
3 TxD	-----TXD ----->	2 RxD
5 SGND	-----SGND ----->	5 SGND

## 8.2 Cable

The RJ-45 ports on the switch support automatic MDI/MDI-X operation. You can therefore use standardized 1:1 twisted pair cables to connect other network devices (PCs, servers, switches, routers, or hubs). Please note the cable specifications in the below table.

- Cable Types and Specifications

Cable	Type	Maximum Length	Network Ports
10BASE-T	Cat. 3, 4, 5100 Ohm	UTP 100 m	RJ-45
100BASE-TX	Cat. 5 100 Ohm UTP	100 m	RJ-45
100BASE-FX	50/125 or 62.5/125 micrometer core multimode fiber (MMF)	2 km	SC or ST

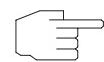
Table 8-1: Table: Cable specifications

## 8.3 100BASE-TX/10BASE-T Pin Assignment

In the case of 100BASE-TX/10BASE-T cables, pins 1 and 2 are used for data transfer. Pins 3 and 6 are used to receive data.

### ■ RJ-45 pin assignment

Pin Number	Assignment
1	Tx+
2	Tx-
3	Rx+
6	Rx-



### Note

The + and - characters indicate the polarity of the wires forming a wire pair.

All ports on this switch support automatic MDI/MDI-X operation. You can therefore use 1:1 cables to connect other PCs, servers, switches, or hubs. In the case of 1:1 cables, pins 1, 2, 3, and 6 at the one cable end are connected end-to-end with pins 1, 2, 3, and 6 at the other cable end. The following table shows the pin assignments for 10BASE-T/ 100BASE-TX MDI and MDI-X ports.

Pin MDI-X	Signal Name	MDI Signal Name
1	Receive Data plus (RD+)	Transmit Data plus (TD+)
2	Receive Data minus (RD-)	Transmit Data minus (TD-)
3	Transmit Data plus (TD+)	Receive Data plus (RD+)
6	Transmit Data minus (TD-)	Receive Data minus (RD-)

